ELECTRICAL REVIEW

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16th July, 1948

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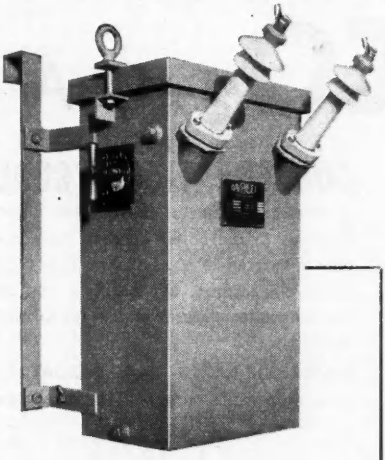

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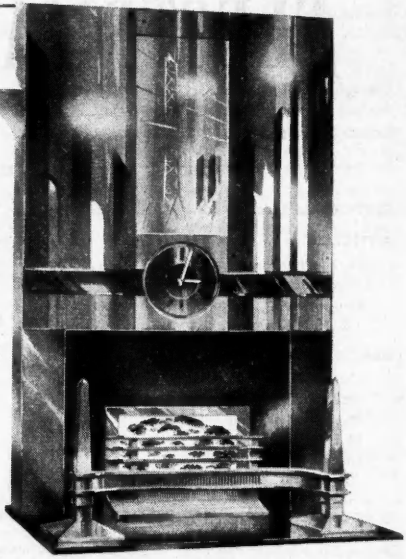

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXLIII. No. 3686 16th JULY, 1948 9d. WEEKLY

Inductive Disturbances

Post Office and Power Supply

IN the early days of electric power transmission the telegraph and telephone were already established services of great national importance. The authorities responsible for them properly took steps to secure the interests of their subscribers against any possibility of inconvenience that might be caused by a newcomer the potentialities of which could be only imperfectly realized.

Time has shown many of the precautions to have erred considerably on the side of safety and thus to have thrown an unnecessary burden, both technical and economic, upon power supply, which was increasingly recognized as at least as important as telecommunications.

Developments in power transmission, more especially at high voltages, have called for re-examination of the position from time to time. Regulations governing the relations of the two electrical services have been relaxed, but in some respects still lag behind advances in technique.

Co-operative Attitude

The position would have been more serious if Post Office engineers had always insisted upon their rights as first comers. Reports from supply authorities, however, pay tribute to their helpful attitude. Nevertheless they could doubtless do more to clear up certain difficulties if their actions were supported by modifications in international practice.

One way in which their co-operation has been beneficial is in a liberal interpretation of requirements in regard to lengths of transposition sections. These in order to comply with the recommendations of the responsible international committee (the C.C.I.F.) should be not less than approximately 11½ miles for unsymmetrical conductor spacing. On the other hand Mr. E. K. Saraoja informed the C.I.G.R.E. that in Finland, where the average length of a complete transposition cycle is more than twice that figure, no interference with telephony had been caused either by dangerous voltages during fault conditions or disturbance voltages during normal operation of more than 1,200 miles of 110-kV lines. Such troubles as there have been are attributed to circumstances with which transposition has had little to do.

Inadequate "Undergrounding"

The same authority also submitted that the laying of a telephone cable underground at 110-kV power line crossings did not afford adequate protection against its damage. This we believe to be in accordance with experience in Great Britain, where both insulation and lead sheaths have been punctured as a result of power-line faults, even when a conductor has not been severed. Although we have confidence in the ability of the Post Office engineers to evolve a solution to this problem, we suggest that the practice of "undergrounding" (which adds appreciably to the cost of construction) is based upon an unjustifiable assumption regarding the liability of power lines to collapse at crossings.

An unduly restrictive requirement that should be brought into line with modern technique arises out of the C.C.I.F.

recommendation prescribing a maximum to induced voltage. The limit of 300 V laid down twenty-one years ago was later raised to 430 V, but the concession was in appearance only. Modern methods of protecting communication staff and equipment would justify a very considerable increase. It is satisfactory to note from the report of the International Study Committee presided over by Mr. C. W. Marshall that no interference from power lines with radio and television need be feared. Mr. Saraoja mentions that average soil resistivity in Finland is high —an important factor—and suggests that short reports on practice in other countries should be submitted at the next C.I.G.R.E. meeting—a suggestion which we hope will commend itself to the Council of that body.

Load Reduction

THE Government has accepted a recommendation by the Electricity Sub-Committee of the National Joint Advisory Council that commercial establishments shall be required to reduce their load between certain times during the winter months. In so far as this will do away with the need for load-shedding or " staggering " in industry, this is all to the good but it is a sad necessity. Nothing definite has been suggested about the domestic load although mention was again made last week of the Clow Committee's report on the subject. It is unlikely that the Committee's recommendations will be such as to make any immediate difference, but it looks as though some form of limitation will be desirable for some years to come.

Fuel Prices

HITHERTO, in speeches about the mining industry, the emphasis has been almost entirely on increased output. At the conference of the Mineworkers' Union at Whitley Bay, however, both Mr. Gaitskell and Lord Hyndley spoke of the need to call a halt to the continued rise in costs. The almost regular increases in fuel prices have come to be regarded as something of a necessary evil—probably many people hardly noticed that there were two further additions last year. Benefits which are conferred on the miners should, as Lord Hyndley pointed out, be paid for by making the industry more efficient and not by putting up the price so high that the British consumer has an unreasonable load to bear and export marketing is rendered difficult.

Alternator Standards

CONTINENTAL manufacturers are troubled in a similar way to their counterparts here by redundant and sometimes mutually incompatible requirements in specifications. These inevitably increase costs and serve no useful purpose. This subject was touched upon during the C.I.G.R.E. discussion on alternators. The values of reactance, short-circuit ratio and voltage regulation that produce the most economical design can safely be left to the manufacturers. There appears to be a need for an investigation of the best technical characteristics of alternators with a view to incorporating them in national specifications.

Mechanical Handling

THE crucial importance of the conveyance of materials can be gauged from Sir Stafford Cripp's statement at the opening of the Mechanical Handling Exhibition at Olympia that the costs incurred in this way are equivalent to 85 per cent of the cost of finished products. The considerable waste of manpower this entails can be considerably lessened by the adoption in many cases of sequence control of electric motors on the lines discussed in our opening article. In devising schemes of this kind British manufacturers can draw upon a great store of practical experience.

Television Progress

AT present only people in the Greater London area can see the television programmes of the B.B.C. and this is obviously unsatisfactory. It is therefore pleasing to hear that the transmitter at Sutton Coldfield, near Birmingham, will be ready for service next year. The next move will be to provide television in the North of England and according to the Assistant Postmaster-General (Mr. C. R. Hobson) the problems involved in extending the service to that area are being worked out. Mr. Hobson would not agree with a suggestion that we were behind America in this respect and gave the common explanation " shortage of raw materials " for the delay in extending the service.

Material Handling Plant

Sequence Control of Driving Motors with Positive Interlocking

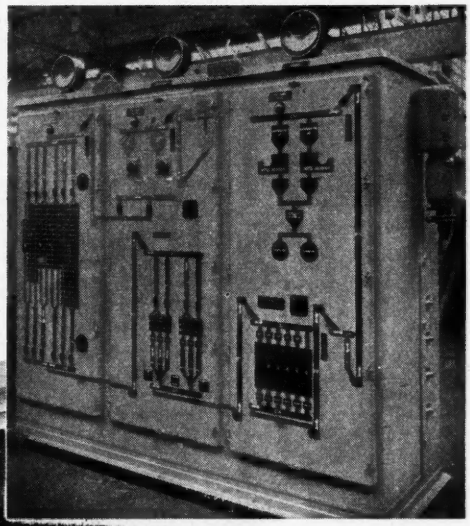
*By P. C. Croft**

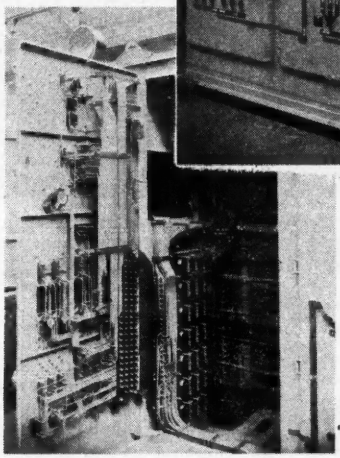
ADEQUATE control of material handling plant is a means of raising plant efficiency, in addition to lowering bulk handling costs.

Interlocking, which is ideally applicable to electrical drives, ensures steady and constant flows of material from point to point without the risk of incorrect operation, which might occur with alternative driving methods, resulting in material arriving at the wrong destination or blockages in the system, to clear which valuable time and labour would be wasted. Although the initial cost of applying electrical drives to a comprehensive material handling plant may, at first sight, appear high, it is justified when low operating cost resulting from the minimization of operating personnel and better continuity of service is taken into consideration.

By grouping the electrical controls centrally full regulation with positive indication of the functioning of the plant can be obtained, thus ensuring that any desired material flow may be brought about with the minimum of time and effort on the part of a single operator. Indication of the behaviour of each drive in a system is most desirable, if not essential. Full confidence in the operation of the plant can be fostered in the operator's mind and, in addition, instant steps can be taken to clear faults in the flow system which may develop as a result of a shutdown occurring in any particular portion of the plant.

Electrical control has advantages over alternative drives, even for one elevator and one conveyor. It is simple to provide for possible future extensions, including the interlocking, which cannot be foreseen when the original plant is installed. In larger schemes the advantages are very much greater, as different routes may be required to operate either singly or together, with frequent changes of course for alternative material flows. Counting, weighing and inspection of products being handled can also be included in the advantages derived from a fully electrical installation. By the employment of light cells incorporated at suitable points on the system correct quantities of material being discharged can be ensured





Sequence-interlocked board with visual flow diagram in colour for centralized control of screw conveyors, elevators, weighers, etc., handling raw material for textile manufacture

* We regret that since this article was written, the author, who was assistant chief engineer to Brookhirst Switchgear, Ltd., has died.—Editors, *Electrical Review*.

with instant rejection of those not up to requirements.

Properly contrived control gear protects the operator by including no-volt features and by preventing access to live parts, while overload tripping devices in the motor circuits avoid excessively-fast starting and consequent transmission of sudden shocks to stationary plant. Choice of gear when designing control systems can importantly affect maintenance and running charges.

Sequence Interlocking

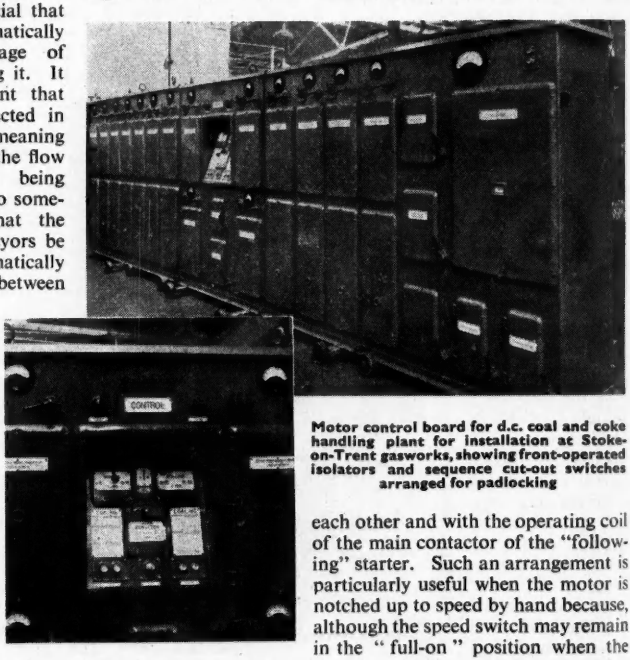
Many drives involve the starting and stopping of motors in essential sequence. For such ordered operation electrical interlocking is imperative and may involve many groups of motors, as for conveyor systems in particular. A shut-down occurring in any one unit of a system engaged in the wholesale transference of material from various directions would cause great dislocation, so it is essential that such faults automatically ensure the stoppage of apparatus preceding it. It is equally important that shut-downs be effected in the correct order, meaning the same order as the flow of the material being conveyed. It is also sometimes necessary that the "following" conveyors be shut down automatically with time intervals between each one, to ensure that each part of the system is cleared of material before the plant is restarted.

The order of starting normally is important, since the units of a multi-conveyor system must be started in the reverse order to the travel of the material; that is, that part of the plant which handles the material first must be started last, followed by succeeding parts until all of the units are in operation to take up the material immediately the flow is initiated.

The means by which this end is achieved is simply an auxiliary switch fitted to the main contactor of each motor starter. It is connected in the operating coil circuit of the main contactor required to operate next, making it impossible to operate the "following" starter out of sequence. The above applies particularly to the use of two direct-switching starters for a.c., but the principle applies equally in the case of multiple-step switching for either a.c. or d.c. circuits.

For rotor starters used with slip-ring motors, or multi-step resistance starters for d.c. motors, in addition to the auxiliary switch on the main contactor, it is sometimes desirable to provide the final resistance contactor with an additional auxiliary contact to ensure that the preceding motor is fully up to speed before the following motor can be started.

These auxiliary contacts (on the main and final contactors) are connected in series with each other and with the operating coil of the main contactor of the "following" starter. Such an arrangement is particularly useful when the motor is notched up to speed by hand because, although the speed switch may remain in the "full-on" position when the starter is tripped, the sequence stopping of the starter which is next in the chain of operations will be fully safeguarded by the opening of the auxiliary switch on the main contactor.



Motor control board for d.c. coal and coke handling plant for installation at Stoke-on-Trent gasworks, showing front-operated isolators and sequence cut-out switches arranged for padlocking

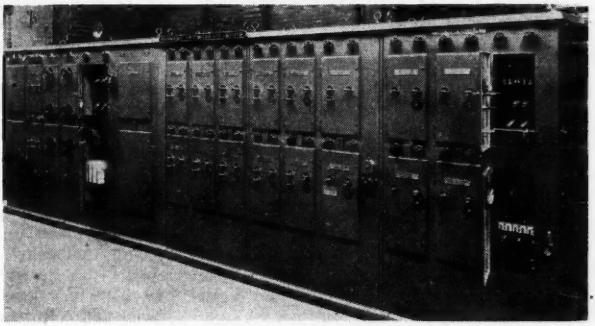
Starters electrically interlocked for sequence can be operated individually, or they can be brought into operation by using automatic contactor-type starters, one after the other in sequence, following and controlled by the starting of the preceding one.

For individual starting the first starter in electrical sequence (that is, the last in the material flow) can be operated by a push-button or control switch, which prepares the control circuits of the next starter for it to be brought into operation similarly and soon until the sequence flow is complete. This simple interlocking prevents incorrect operation of any drive out of sequence, but necessitates the individual starting of each motor by the operator. For cascade sequence control of a group of motors, starting of the whole can be done by simply starting the first motor in sequence. The auxiliary switch, as previously described, initiates the circuit to the contactor closing coil of the next starter in turn, this procedure being followed by each successive starter until the group of motors is running. This arrangement of automatic starting of a group is usually governed by the h.p. of the various motors, as the rapid starting of a number of large motors may excessively strain the supply network. If multi-step starters are used, advantage is taken of the time needed to bring a motor up to speed before starting the next by allowing the final speed switch to initiate the next starter in sequence, thus ensuring that the current peak of the preceding motor subsides before a further peak is caused by starting the succeeding drive.

With increasing use being made of high voltage squirrel-cage motors, which are usually started by direct switching, it is desirable to introduce some delay between the starting of large motors forming a group, usually by time or current control, or both.

Time control is achieved by introducing a relay, having a time-delay switch, or by operating a time-delay switch from the main contactor itself. The delay period, usually adjustable over a medium range, can be set to suit the accelerating time peculiar to the drive concerned. It may vary due to different characteristics of the materials to be handled.

Current control has the advantage of being more flexible in that adjustments are not necessary when handling various grades of material. The delay is dependent upon the current characteristics of the running motor, so that the " following " starter is automatically brought into the sequence flow only when the peak current, caused by the starting of the preceding motor, has dropped to a normal value.



Multi-motor board controlling a.c. and d.c. drives of plant installed at Port Tennant, Swansea, of the Magnesium Metal Corporation

The current control relay consists essentially of two coils, shunt and series, each having its own magnet system. The armature of the shunt magnet is so disposed in relation to the series coil magnet that it is able to close the series magnet mechanically when itself is closed. The series coil magnet carries an auxiliary switch connected in the coil circuit of the contactor controlling the " following " motor and arranged to close this circuit when the series magnet releases.

The operation of the current control relay is such that the shunt coil is energized together with the main contactor, thus closing its armature and mechanically closing the series armature. The auxiliary switch on the series magnet opens. Having assisted the series armature to close, the function of the shunt magnet is complete and the series coil is able to hold the magnet closed with its auxiliary switch open, due to the high switch-on current taken by the motor during its accelerating period. The relay is calibrated over a range of currents so that, as the motor accelerates and the switch-on current drops, the series coil releases, allowing the auxiliary

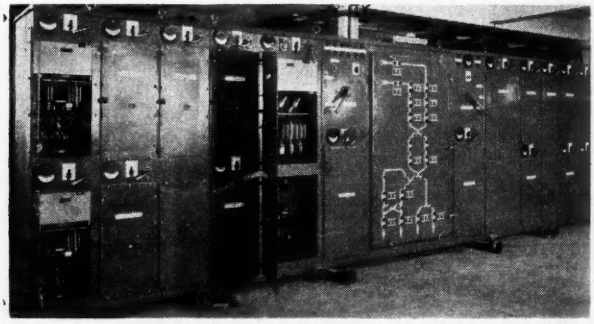
switch to close and so complete the circuit of the next starter required in sequence.

Under-feed switches are often fitted to the tail-end of conveyors and act both as sequence switches during starting periods and as protective switches should the conveyor stop, because of slipping or broken belt, even though the starter contactor is closed.

Motor-driven timers may be used when separate time periods can be predetermined accurately. During starting the various time periods are designed to allow each drive or machine to reach full speed before the next is started. When stopping normally the time device can be made to allow each drive to clear itself of material before stopping, thus completely clearing the system of the material being conveyed.

Isolation

Complete isolation of " live " connections in a group of starting panels is of great importance. Main isolating switches are usually fitted to each starter and motor for maintenance purposes. The starters are fully interlocked to prevent access to live parts until the isolating switch is " open " and so arranged that the switch cannot be closed until the doors of the starter cubicle are closed. Usually, in non-sequence-interlocked starters, it is sufficient to isolate the incoming supply mains, since all auxiliary control circuits are directly associated. Where, however, a number of starters are essentially connected for sequence control, a number of interconnections are necessary and these could be " live " from an alternative source of supply.



Sequence-interlocked switchboard for power station coal-handling plant in U.S.S.R. with flow diagram, signal lamps and push-button stations for each drive

It is necessary, therefore, that additional isolating contacts be provided on the main isolator so that the opening of the isolating switch not only disconnects the starter from the main supply, but also disconnects all line leads which enter the starter from other starters in the sequence. Failure to isolate all leads associated with sequence interlocking can be highly dangerous and gives a false sense of security to the operator.

Sequence Cut-Out

An essential feature of any sequence interlocked scheme is that the starting of one motor is conditional upon the preceding one running first. From a maintenance point of view this is not always desirable. It would not be economical to run a whole line of plant in order that one particular portion may be run for test purposes. Arrangements are therefore made for fulfilling both conditions. To allow any particular portion to run out of sequence each starter is provided with a pilot circuit control switch, suitably labelled and giving any of three positions, " sequence " — " off " — " test." With the control switch in the " sequence " position, the starter and its associated portions of the plant are under full sequence control, while placing the switch in the " off " position renders the starter inoperative. With the switch in the " test " position the particular starter can be operated out of sequence and, by a combination of contacts on the switch, the " following " starter is prevented from operating, which is the normal procedure under full sequence control. It is considered advisable for a spring-return feature to be incorporated in this switch so that the operator is compelled to hold it over during " testing " operations but, in the "sequence" position, it is self-retained. Unauthorized operation can be prevented by padlocking the switch in the sequence position only.

Control of individual or group drives may be by " start " and " stop " push-buttons or three-wire or two-wire switches. With three wires the main contactor of each starter is self-maintained (the closing having been

initiated by pressing the start push-button) until the starter is tripped either by pressing the stop push-button or by the operation of the protective devices. In order to restart it is necessary to press again the start push-button. With two wires the motor, if tripped by operation of the protective drives, can be restarted by resetting the protective gear or, if stoppage is due to a failure of the supply, on the resumption of supply.

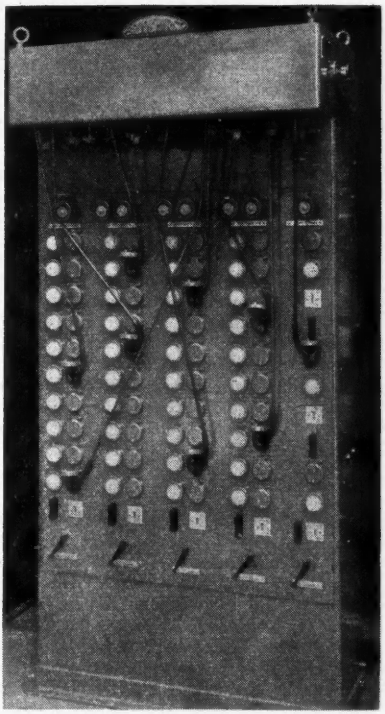
To permit instant stopping in case of accident, any number of push-buttons can be connected in series and mounted alongside the various portions of the plant. Pressure on any one button will stop the particular drive with which it is associated while the normal interlocks ensure that all preceding drives also shut down.

Alternatively, the scheme can be arranged so that the pressing of any push-button will stop the complete plant and the buttons can have a " lock/off " device to render the plant inoperative until the button is reset by hand. A form of emergency stopping sometimes employed on a long conveyor route uses a switch having an external operating handle to which is attached a wire pull-rope running the whole length of the conveyor system, the switch being capable of being reset when the rope is released. This arrangement of one switch instead of a number of separate buttons avoids many breaks in external control wiring and the looping-in of the control cable between push-buttons. Thus cost of wiring, especially when p.i.l.c. and a. cable is used, can be reduced.

Central Push-Button Control and Indication

Concentrated control of a complete plant facilitates centralized indication of the state of each particular section, including the current being taken by each motor. whether a motor is running or stopped, and positions of chute switches at all junctions of the plant.

Control " stations " vary from a simple desk housing the requisite number of push-buttons to an elaborate pillar incorporating push-buttons, selector switches, indicating lamps and valve indicators for comprehensive schemes covering a number of alternative sequences. In a simple installation it is usually sufficient to indicate whether all motors are running, together with the currents taken. The respective start and stop push-buttons, ammeters and pilot-lamps (red to indicate motor running, green to indicate motor stopped) for each particular motor are grouped together and labelled. The motor current is registered on an ammeter which is usually operated from current transformers



Special plug board with facilities for almost infini.e variation of sequence

of suitable ratio fitted in the respective starters. They usually have secondaries so as to reduce VA capacity and possible scale errors caused by excessively long interconnecting leads between the starters and the control desk.

Remote indication of motor " running or stopped " is given by the coloured lamps which are switched on or off by corresponding auxiliary switches fitted to the main contactor and protected by fuses in the starter.

In comprehensive schemes selector switches, in addition, may be required to cater for alternative sequences. When material may have to be transported from a common feeding point to various alternative discharge points, some conveyors may be required to run in sequence with a number

of other drives and the interlocking arrangements must be foolproof and yet sufficiently flexible to permit the quick and sure transference of any starter into the correct position in the electrical sequence so as to deal with the required material flow. To achieve this a combination of push-buttons and selector switch is usually sufficient to enable the operator to select the required drives and start up in the correct order. Thus, by simply moving a selector switch to a known position and pressing a button, the required line of drives from discharge-end to feeding-end can be brought into operation with the minimum of time and effort.

In some plant layouts handling various grades of material either individually or collectively, centralized control is the means of speedy transference of material from one point to another, involving the control of various groups of motors while still retaining the all-important sequence interlocking, with complete visual indications of disposition and operation of plant extending over a very large area.

Chute Operation

Such plants usually have chutes at various junction points on the conveyor routes to divert the material from a common feeder to a number of alternative routes. The chutes are heavy steel doors capable of being moved by racks and pinions to permit the material to move into one or other flow. It is very essential that the various alternative positions of these chutes should directly control the operation of adjacent plant, otherwise blockages at the junctions would be liable to occur, due, for example, to material being diverted on to a stationary plant. In these circumstances, advantage is taken to mechanically couple a "chute switch" to each chute with contacts electrically connected into the interlocking system, so that the position of the chute is directly co-related with the control of the particular plant, or drive concerned.

The chutes employed may be of the "on-load" or "off-load" type; that is, they can be opened or closed either when the material is flowing or stationary. The electrical interlocking is arranged to cover either or both of these conditions. With the "off-load" type, any movement of the chute away from its pre-set position will shut down the system up to the position of the chute in the material flow; whereas with the "on-load" type, providing an alternative route for material flow has been previously brought into operation, the chute can be changed over and continuity of flow maintained.

The position of all chute switches on the plant can be indicated on the central control desk by pilot lamps operated by auxiliary contacts on the chute switch. Where plant is scattered over a wide area it is sometimes necessary to have a mimic diagram of the plant on the desk or control panel which represents the physical location of all plant, including, among other things, feeding and delivery points, main and by-pass routes, cross-over points, etc.

Descriptive Charts

The motors are represented by pilot lamps positioned correctly in relation to actual plant layout, on the mimic diagram. Where a number of alternative sequences are available, a series of descriptive charts is sometimes provided, each having a reproduction of the mimic diagram. Superimposed upon it, usually in colour, are shown the motors required to run, the positions of chute-switches and other information necessary for a particular material flow to be put into operation. When the particular flow or flows have been decided upon (several alternative flows are grouped on one chart where common drives are used for different purposes) the required chart is selected and placed in the space which is provided for it on the face of the control board.

Having ascertained, from the chute switch indicating lights on the control board, that the chutes are correctly positioned, the selector switch is correctly adjusted and the required button is pressed (as indicated on the selected chart) to start the whole plant in the correct order.

Indication of Stoppages

As each motor starts, the corresponding pilot lamp on the mimic diagram is illuminated until finally indications of feeding and destination points, motors running and positions of chute switches are given on the mimic diagram. This system of indication is particularly useful for determining exact positions of stoppages. In the event of any particular motor shutting down all motor indicating lamps will be extinguished up to the point where the stoppage has occurred, so that instant steps can be taken to investigate the cause of the breakdown.

Illumination Conference

Eleventh Session of the International Commission

By G. F. Cole

THE eleventh session of the International Commission on Illumination, held under the presidency of Dr. N. A. Halbertsma (Holland) in Paris from 29th June to 7th July, was attended by 400 representatives from 16 nations, the largest overseas delegation being from Great Britain with 166 representatives. The Commission was established in 1913 to provide an international forum for the discussion of all matters relating to illumination, to promote their study, to provide for the interchange of information between countries, and to agree upon and publish international recommendations.

The programme was a very heavy one as the meeting was the first since 1939; the Commission normally used to meet every three years. The opening session took place at the Sorbonne on 30th June under the presidency of Monsieur Louis de Broglie, holder of the Nobel Prize for Physics. Monsieur M. Leblanc first delivered an address of welcome and then Monsieur de Broglie gave a short talk on the physics of fluorescence. Dr. N. A. Halbertsma demonstrated the application of fluorescence to lighting and the meeting concluded with a film on Prof. Charles Fabry, a past-president of the Commission.

National Committees

The organization of the Commission is based on the existence in the various countries of National Illumination Committees which have under them technical sub-committees to study various subjects. Each country takes responsibility for one or more subjects and collects information from other countries for inclusion in the reports which are presented at the sessions of the Commission. In addition to the actual secretariat reports, a wide variety of papers is presented and discussed.

It is yet too early to assess the success of mains operated or pneumatic fluorescent lighting in mines but the first reactions are favourable. Further work is being carried out amongst the various countries to obtain more detailed information regarding costs of operation, effect on output from the mines and the effect on the incidence of nystagmus.

The discomfort experienced on entering a cinema is well known and there would appear to be no major reason why auditorium lighting should not be increased at least enough to permit patrons to find their seats without detracting from the brightness of the picture on the screen. The brightness of the picture is often reduced by over 50 per cent due to poor maintenance of the screen itself.

At the meeting devoted to street lighting there was evidence of attempts to produce statistics showing the effect of street lighting on accident rates. It was pointed out, however, that such surveys had to be made over a long period and that there were so many variables to be taken into consideration that it was difficult to prove anything by figures alone.

Aviation Lighting

Perhaps the most important single subject before the Commission was that of aviation lighting, both in the aircraft and on the ground. Delegates considering this subject found their hands full and their meetings extended over several days.

Full though the programme of technical sessions was, the French National Illumination Committee, which was responsible for the whole meeting, included a number of excellently organized social events. On 30th June, delegates were taken to see the floodlighting of Paris which had been arranged in their honour, especially the Arc de Triomphe and the Opéra, the latter being floodlighted from the outside with tungsten lamps and from within the façade with neon tubes. Following this tour delegates were entertained at a dance given by the Association Française des Eclairagistes.

On the Thursday evening the lighting of the Louvre was inspected, before a reception given by Madame Maurice Leblanc and the Ladies' Committee at the Hotel de Rohan. Saturday afternoon and evening were devoted to a garden party at the Palace of Versailles, including a concert in the Chapel Royal, a tour of the palace and grounds and dinner in the Orangery followed by dances by the *corps de ballet* of the Opéra. The delegates

were received by the Paris Municipality at the Town Hall. Other excursions were arranged each day for the ladies.

The fact that the number of delegates was twice that of any other meeting indicates the growing interest in lighting matters throughout the world. The number of countries represented in Paris was slightly smaller than on some previous occasions only because of the loss of contact with some countries during the post-war period. Thanks are due to the French Committee for the way in which it arranged this international gathering.

Commission's Recommendations

New Name for the "New" Candle

*By L. H. McDermott**

BY agreement reached at the eleventh session of the International Commission on Illumination, the "new" unit of luminous intensity will in future be known in all countries as the "candela," the abbreviation being "cd." This was one of the numerous recommendations agreed to at the final plenary session. In the unfortunate absence of both the hon. secretary, Sir Clifford Paterson, and the general secretary, Mr. J. S. Preston, Dr. J. W. T. Walsh (N.P.L.) deputized for both. The British National Committee was the next largest to the French. As Dr. Walsh, chairman of that Committee, was otherwise engaged, Dr. S. English, with Mr. J. M. Waldram as deputy, acted as leader.

There were twenty-five secretariat reports; five of them (those on light sources, traffic signals, calculations of projector systems, natural daylight and theatre stage lighting) had been prepared in this country and they were presented respectively by Dr. J. N. Aldington (Siemens), Mr. W. Hadfield (Ministry of Transport), Mr. J. P. Bowen (Trinity House), Mr. W. Allen (Building Research Station) and Mr. L. G. Applebee (Strand Electric). It is not possible to detail all the official recommendations of the Commission, but those mentioned below are possibly of most general interest.

On the subject of vocabulary, contact is to be made with astronomers with a view to unifying the various photometric terms used in the two sciences, while the session on "light and vision" agreed to investigate the possibility of determining a standard spectral sensitivity curve for the dark-adapted eye. A number of recommendations were produced on the subject of photometry, both visual and physical, one on standardizing the exit pupil of visual photometers and another concerning the relative merits of the main methods of achieving an "average eye" spectral response in a physical photometer.

The meeting on colorimetry also produced a number of recommendations, including those defining certain colorimetric terms. Also it was agreed that National Committees should sponsor researches into the adequacy of the standard luminosity function with special reference to the extremes of the visible spectrum and that, in connection with colour-rendering properties, there should provisionally be eight spectral bands. So far as the meetings on "diffusing materials" and the classification of lighting fittings were concerned, chief discussion centred round the recommendations passed at previous sessions and they were in general confirmed; the latter subject will now include the consideration of asymmetric fittings.

At the meeting on automobile lighting two distinct schools of thought on the question of passing beams were revealed and it was agreed that joint tests with other countries should be carried out with the object of reaching an internationally-acceptable solution. It was evident when discussing the lighting of museums that the use of fluorescent lamps will become of much greater importance, but a resolution was passed directing attention to the desirability of obtaining information on the rate of deterioration of certain objects, such as paintings, as a result of the action of ultra-violet light from such lamps. It was also agreed to set up a separate secretariat on the subject of architectural lighting.

On the question of aviation lighting, contact had already been made by the Commission with the International Civil Aviation Organization (I.C.A.O.) and two delegates from this body were present. It was agreed that further tests were necessary with both approach and runway lighting before any

* Hon. secretary, National Illumination Committee, Ministry of Works.

international agreement is likely. The draft I.C.A.O. recommendations for navigation light standards were dealt with and it was agreed that the unification of any alternatives was most desirable.

The meeting on " traffic signals " produced recommendations dealing with arrow signals, pedestrian signals, etc.; a joint meeting of all those interested in coloured signals agreed to set up a new secretariat charged with the task of co-ordinating the specifications at present in use for the various coloured signals on roads, railways and aircraft and those used for marine work.

Consideration will now be given by member countries to the method of calculating the intensities of large projection apparatus as set out in BS.942 (for lighthouse beams). So far as natural daylight is concerned, the measurement of daylight factors will be further investigated and the sunlight requirements in the different countries will be studied.

The recommendations from the meeting on ultra-violet light concerned both the minimum amount of radiation which would be effective and also the maximum quantity which will not be harmful in specific instances; an exchange of ultra-violet lamps will be made for the purpose of making comparative measurements. In the meeting on voltage variations, a number of terms were given definition.

Cinema and Stage Lighting

Cinema lighting was also discussed; it was agreed to make a study of the various types of screen used in different countries and to encourage the use of an instrument for the measurement of screen brightness. The theatre stage lighting meeting agreed to collect information regarding the spectral distribution of filters and also to press for the international standardization of projector lamps used for stage lighting. In addition a visit of inspection was made to the Opera House and a television studio and a theatrical performance was staged in such a way that the audience could see the various theatrical devices employed.

The secretariat reports were supplemented by a number of papers on various subjects and of these eight were contributed from this country. There was one on fluorescent street lighting and another on fluorescent lighting at the coal face, both of which developments are associated with this country; there were also two papers on colorimetry, two on museum lighting, one on high intensity mercury discharge lamps and one on aircraft lighting.

At the final plenary session the following officers were elected:—president, Dr. Halbertsma; hon. vice-president, Sir Clifford Paterson; vice-presidents, Dr. Walsh (N.P.L.) M. Leblanc (France) and M. Folcker (Sweden); hon. treasurer, Dr. H. Koenig (Switzerland) and hon. secretary, Mr. C. A. Atherton (U.S.A.). This last election will mean that the Central Bureau will now go from the National Physical Laboratory to the United States. The next meeting of the Commission will be held in Sweden in three years' time and for that meeting the secretariat allocations are such that this country will be responsible for the subjects of light sources, calculations on projector systems and theatre stage lighting.

The arrangements for the meetings were, of course, in the hands of the French Committee, under the presidency of M. Maurice Leblanc, and a magnificent programme of " divertissements " was carried out to the evident pleasure and appreciation of all who took part. Towards the end of the meetings, the foreign delegates entertained their French hosts at dinner at the Eiffel Tower.

College Teaching Methods

THE appearance of the first issue of the " Bulletin of Laboratory Practice in Electrical Engineering " signifies the successful launching of a scheme initiated by Dr. J. E. Myers, principal of the College of Technology, Manchester, for the more effective interchange of information likely to improve methods of teaching and the development of laboratory facilities. Educational establishments working to degree and Higher National Certificate standards have lacked a suitable medium through which teachers' efforts in this direction may be recorded and circulated. The new " Bulletin " is intended to satisfy this need. It contains an explanatory foreward by Prof. Willis Jackson (City and Guilds College, London) chairman of the Advisory Panel conducting the scheme. An article on " Field Plotting " by Prof. M. G. Say (Heriot-Watt College, Edinburgh) is followed by abstracts of eight detailed reports on field plotting in electrolytic tanks and on the current flow analogue with a three-core cable model; also on models to illustrate the law of the moving iron instrument, short circuit calculator, distribution of load currents in a power network, ring main protected by very high speed relays and a four-wire static three-phase balancer. Copies of these reports can be borrowed from the organizer, Mr. E. Bradshaw, College of Technology, Manchester, 1.

Views on the News

Reflections on Current Topics

GRUESOME details are given by David Gunston in the *Spectator* of the methods used for killing whales—a subject to which I have referred before. Mr. Gunston considers that the only humane alternative to the present system is electric whaling by which the creature is electrocuted by a current passed through its body by means of a harpoon. Norwegian scientists before the war found the method to be speedy and efficient; the drawback seems to be the necessity for a considerable modification of existing apparatus. Mr. Gunston thinks that the Government can only be "jostled into action" in this matter by the force of public opinion; the obstacles to be overcome in fitting all our whalers with the equipment are not great.

* * *

For very good reasons the Ministry of Fuel and Power frowns upon additions to the space heating load at the present time. Even so, I feel that the Oxford Regional Hospital Board has cause for grievance at the refusal of the Ministry to allow electric fires to be provided in nurses' rooms at the Swindon Maternity Hospital. The Board contends that fires are essential in view of the work done and the need to stimulate recruitment of nurses. Were there a general ban on electric fires there would be a strong argument for exception to be made in such a case.

* * *

In fuel-economy publicity I have not hitherto come across any reference to the desirability of using suitable saucepans on electric hot-plates. Now, however, I see that the useful little publication of the Electrical Association for Women, *Cheerful Rationing*, points out that, using a well-fitting solid-base saucepan on a 1,800-W solid boiling plate, three pints of cold water, starting with a cold plate, can be boiled in 10 minutes, whereas if the pan is distorted the time may be as much as 25 minutes. If a distorted pan were used only sixteen times a week, 324 kWh would be wasted in a year. Apart from the economy aspect, this would mean that, with electricity at ¾d. per kWh, the user would pay over £1 a year more than necessary. Furthermore, a buckled saucepan will probably burn the food at the spots where it does make contact, while the uneven distribution of heat may damage the boiling plate itself. As to a suggestion that it is also an advantage to use solid flat-based saucepans on radiant plates I am not so sure. I should have thought that, to take full advantage of the quick-heating characteristics of this type of plate, the lighter the saucepan within reason the better.

* * *

As a good example of verbal acrobatics I commend the following from a letter to the *Cornish Times:*—

> "Please permit local electricity-seeking farmers to express a pious wish through the stalwart independence of your columns that the same slap-happy inconsequence associated with the recent farcical clothing coupon volte-face, may ensue in the case of farm priority for electricity, promised contemporarily on the comunising a month or two ago of the latter industry (now, doubtless, administered from a London luxury flat !), since rumours are being voiced abroad that material and current will not be available for an indefinite period to implement to any appreciable degree this unctious solicitude on the agriculturists' behalf!"

* * *

The *Daily Telegraph* reports that the Conservative Party headquarters has advised all Opposition peers and M.P.s to send complaints and queries about the electricity service direct to Lord Citrine himself. This is intended to be a method of forcing the B.E.A. to set up an organization for dealing with complaints such as was established by most companies under private enterprise. I had gained the impression that there were no complaints under private enterprise. But, seriously, if "over-centralization" is to be discouraged surely the approach should be to the district manager or, at the most, to the Area Electricity Board concerned.

* * *

The Post Office, I am pleased to see, has no doubt about the status of electricity authorities under nationalization. According to the *Evening Standard*, a consumer sent the payment for his quarterly bill to the London Electricity Board in an unstamped envelope marked "O.H.M.S." The postal authorities had no hesitation in surcharging the Board 5d. and the consumer's account is now to be debited with this amount.

Heavy Electrical Plant

Final Proceedings at the C.I.G.R.E., Paris

IN our two preceding issues we have reported the technical and social activities of C.I.G.R.E. in Paris. Towards the end of the programme came discussions on heavier electrical apparatus. The discussion on alternators indicated the complexity of the relationships between regulation, reactance, overspeed security, weight and price. For example it was stated that the moment of inertia, necessarily high to secure regulation of stability, can be reduced by the use of a voltage regulator which maintains constant flux instead of constant voltage; also that simultaneous reduction of all reactances increases the weight proportionally.

Alternator design in relation to stability of transmission over distances exceeding a quarter wave length, the effect of a second winding on the rotor in quadrature with the main winding and fed from an external source only during transient conditions, and a machine power-factor rating of 95 per cent were other points.

Overspeed Prevention and Tests

A cross-coiled rotor was described (Wilczek) which obviates insulating troubles found with long radial-slot machines. Attention was also drawn to papers dealing with calculations for alternator characteristics. It was considered that over-speed prevention devices should not be relied upon to reduce constructional safety measures against stresses. Some difference of opinion was noticed regarding whether overspeed tests should be carried out after erection, but British opinion favoured them.

Air-blast circuit breakers are favoured in most countries. Methods of indirect testing of breakers described may influence development considerably in some countries in view of the increasing magnitude of rupturing duties. Natural system frequencies, in which pioneering work in Britain has been of great importance, and the need for precise definition of recovery voltage provided other important topics. The desirability of inserting resistance when switching in transformers at no-load was also mentioned (Kurth).

At the final technical meeting transformers were discussed from a summary of the papers which was made by Mr. E. T. Norris as "special reporter." These papers made it clear that the problems of most importance to both manufacturers and users concerned were, first, surge strength and insulation and, secondly, full utilization of loading capacity. During recent years knowledge has greatly increased (British designers largely contributing) regarding characteristics of surge insulation and the behaviour of transformer windings to incoming surges; this advance is mainly due to the cathode-ray oscillograph and the recurrent-surge apparatus for studying stress distribution.

The effects of inter-turn reinforcement and of electrostatic shields or capacitance compensation have been studied (Novak). Severe stresses were shown to result from failure on power-frequency pressure tests, and the possibility of their combination with stresses due to lightning or switching may influence design. Other surge characteristics of a winding such as natural frequency and surge impedance may affect circuit-breaker operations and hence, possibly, the design of transformers (Paillet and Dufour).

Examination of the wave shape of the surge current (Wellaur and Aeschlimann) seems to provide a promising means of detecting failure, since it enables surge tests to be made, power frequency tests being restricted to the single purpose; the practical constants of the measuring circuit and the value and nature of the impedance required between the end of the winding and earth remain to be determined.

Loading and Temperature

Methods of ascertaining the safe loading of a transformer for any operating conditions, which depends upon the relation between insulation life and temperature, were discussed (Caudron and Rossier). The use of thermal images for simulating hot-spot temperatures in the windings of transformers while in service seems to be of potential importance. Standardization of large transformers up to 220 kV (Gaulet and Perrin), though relating primarily to French conditions, is of general interest in many respects.

Miscellaneous papers included one on the trends of electrical development in twenty-one countries (J. Kopeliowitch) leading to the conclusion that electricity production is likely to be greatly expanded in the coming years. Hydro-electric developments in the Nile Valley were detailed in another report

(Ahmed). In connection with investigations in relation to transmission at 400 to 500 kV, reference should be made to the Tidd (U.S.A.) testing station (Gross and Wagner), where three miles of test lines have been erected, as well as to several Swedish papers. As in the case of the Chevilly station (which has as its more immediate purpose the transmission of hydro-electricity from the Massif Central and the Rhône to Paris), the principal aim of the project is the determination of corona losses with various sizes and arrangements of conductors, with and without earth wires, under different atmospheric conditions.

An edition in English of the proceedings of the conference will be published later in three volumes at approximately £5 17s. 6d. the set. It will contain a memorandum on the conference with a list of members, a complete collection of the 117 papers submitted and reports of the discussions in these papers.

Mechanical Handling Exhibition

Electrical Features at the Olympia Show

ON Monday last there opened at the National Hall, Olympia, the first National Mechanical Handling Exhibition and Convention where 128 makers are demonstrating the numerous ways in which mechanical equipment can aid production by lessening the need for man-handling, thereby speeding up operations and lowering overhead costs at all stages.

The exhibition, which will remain open until 21st July, has been organized by *Mechanical Handling* with the support of British trade associations and at the convention, held concurrently, seventeen papers are being presented by engineers and large users of this type of equipment. One paper, prepared by Mr. F. G. Mitchell, is concerned with coal, coke and ash handling in power stations and will be read on Monday morning next (19th July) while a coloured film entitled "Mechanical Handling," which was produced under the auspices of the Mechanical Handling Engineers' Association (referred to last week in the *Electrical Review*, page 56), is also to be shown.

A large proportion of the exhibits are of necessity electrically driven or controlled and in this way the extreme flexibility and convenience of electrically operated machines is shown to advantage. Various examples of conveying and elevating gear are illustrated by working equipment, models and selections of photographs relating to almost every kind of industry.

A selection of "Sherwen" electromagnetically operated vibrating equipment is shown by the Fraser & Chalmers Engineering Works (G.E.C.) together with the well-known "Gyrex" mechanical screen and electromagnetically operated conveyors, another attraction being a working arrangement of laboratory size vibro-conveyors.

Electric vibrators of various sizes, which can be used for maintaining the flow of materials in hoppers and similar duties, are displayed by E. P. Allam & Co., Ltd. A vibrating table seen on the same stand can be driven by an electric motor and used for the packing of materials in barrels, boxes, sacks, etc. Electrically actuated feeders and conveyors as well as screens are offered by Lockers (Engineers), Ltd. Electrical vibrators and electronic weighing and filling machines are shown by the Sinex Engineering Co., Ltd.

The hand-truck and stillage has for many years held the field in shops engaged in batch production, but more recently the mechanically propelled fork truck and pallet method of

General view of the Mechanical Handling Exhibition

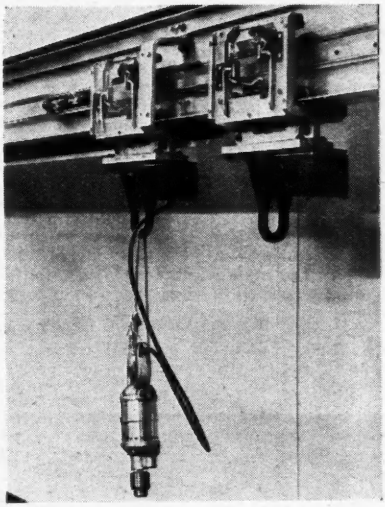
material handling has assumed prominence and seems destined to become an important feature of industrial transport facilities. Crompton Parkinson, Ltd., exhibit several electrically driven trucks, including the "Electricar" mobile crane named the "Mynne." A selection of vehicle batteries is also shown incorporating the Young "armoured plate" assembly, designed for strenuous service. Other accumulators of all forms are displayed by the D.P. Battery Co., Ltd. The range of trucks manufactured by Cleco Electrical Industries, Ltd., of a capacity of one ton, caters for a variety

of requirements in both single- and multi-storey factories.

An "electric horse" is made by Leverstart, Ltd., and a mobile "Squirrel" electric stacker by the Angel Truck Co., Ltd. An exhibit by I.T.D., Ltd., is the "Stactruc" one-ton fork-lift truck with an elevating height of 9 ft, a similar model being obtainable with a 12-ft lift. It is electrically driven and incorporates hydraulic mechanism which enables the lifting forks to be rotated through a full 360 deg for numerous industrial purposes such as pouring molten metal and emptying containers into hoppers. The one-ton fork-lift truck of Ransomes, Sims & Jefferies, Ltd., has electro-hydraulic elevating mechanism and tilting mast. The "Conveyancer" range of fork-lift trucks is made by Electro-Hydraulics, Ltd.

The "Electric Eel" range of "lowlift" tiering and heavy duty tractor trucks manufactured by Steels Engineering Products, Ltd., demonstrates the exceptional ease and safety of operation achieved by means of an unusual design of steering and control arrangements.

Battery-driven "B.E.V." trucks (Wingrove & Rogers, Ltd.) include a one-ton model specially designed to elevate low stillages (7 in.) as used with hand-jack models; pedestrian-controlled electric jack trucks are also made. Battery-propelled trucks by Tomlinson (Electric Vehicles), Ltd., for inter-works use have tiller steering and one-ton chassis. The King's Cross Truck Co., Ltd., also offers electric stacking machines. Scott electric vehicles



Left: Fork-lift battery truck (*Ransomes, Sims & Jefferies*). Above: Wall-mounted "power track" (bus-bars) for drop-down hand tools (*Asea*)

(Cradley Heath Manufacturing Co., Ltd.) have either fixed or hand hydraulic elevating platforms.

Two models of the Lansing Bagnall industrial vehicle as illustrated in the *Electrical Review* of 14th November, 1947 (p. 742), incorporate several improvements, including a motor-generator set to eliminate the necessity of a separate charger.

The electric hoist is an important accessory that is much in evidence and there seems to be an increasing number of manufacturers producing it. The "Hoistmaster" range, embracing models from 5 cwt to 5 tons, as described elsewhere in this issue, is displayed on the stand of R. D. Cardiff, Ltd.

The extra-lightweight "Minilift" hoists of the Didsbury Engineering Co., Ltd., include a one-ton electric model. Electric pulley blocks are obtainable from Matterson, Ltd., as well as Charles Willetts (Junr.), Ltd.; the latter also supply cable drum jacks of several patterns. The fabricated steel electric hoists of C. E. Reed & Co., Ltd., have rope-winding guides to allow off-centre lifting by monorail track outfits.

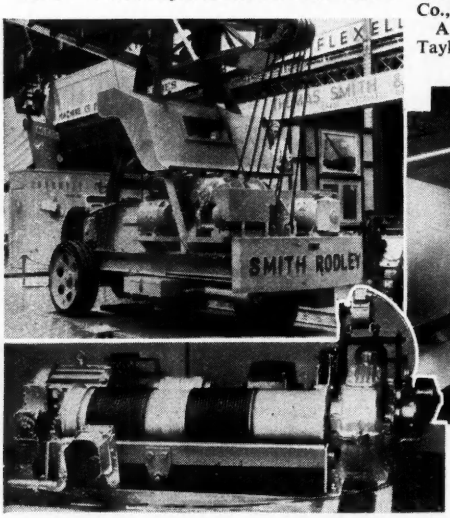
Two motors drive the hoist on an overhead gantry shown by Richard C. Gibbons & Co., Ltd. Both hoist blocks and overhead travelling cranes are furnished by the Aabacas Engineering

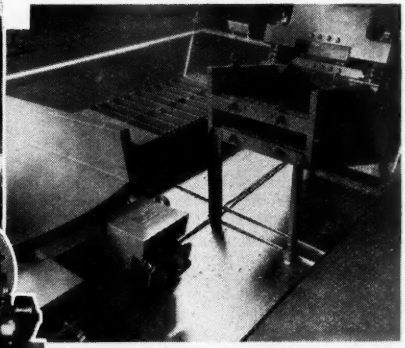
Co.. Ltd. The British Hoist & Crane Co., Ltd., shows fixed and mobile electric winches. Electric chain-pulley blocks are made by G. W. King, Ltd., for handling loads from 5 cwt to 5 tons.

Representative examples of " Asea " electric hoists include models suitable for special industrial processes such as degreasing, foundry moulding and galvanizing. The same manufacturers exhibit for the first time a power track which is fully protected; also a self-contained trolley wire system having four conductors suitable for overhead cranes, which is claimed to overcome the difficulties associated with the safeguarding of trolley wires.

In addition to hoist blocks, the Paterson Hughes Engineering Co., Ltd., exhibits a 3-ton crane crab mounted on a gantry and wired for both travel and hoisting motions. It can be a.c. operated and has a patent creeping control for positive regulation of speeds down to 5 in. per minute.

The principal exhibit of the Vaughan Crane Co., Ltd., is a 2-ton overhead crane crab running on a short gantry. It incorporates " Vestac " variable speed control on all motions





Top left: Multi-motor diesel-electric three-wheel jib crane (*Smith & Sons*). Above: Electro-magnetic vibrating screens (*Fraser & Chalmers*). Bottom left: Gantry crane crab showing auxiliary reference voltage generators for electronic control (*Vaughan*)

using eddy current slip couplings in the drives. An alternative control, using electronic methods, is also shown so that the relative advantages of each system can be compared. Butters Bros. & Co., Ltd., have a new travelling mono-tower crane for shipyards. A mobile diesel-electric crane with cantilever jib offered by T. Smith & Sons (Rodley), Ltd., is mounted on solid rubber tyres and will lift a load of 5 tons within a 10-ft radius.

Coal- and ash-handling equipment for a modern power station, designed to receive both sea-borne and rail-borne coal, is illustrated by Babcock & Wilcox, Ltd., with the aid of a large model supplemented by photographs and exhibits of some of the component parts. Prominence is given by John Thompson, Ltd., to a conveyor with a submerged belt for removing boiler ash and grate clinker.

The Lamson Engineering Co. shows a novel pneumatic tube system embodying automatic pre-selection of delivery point. The sender merely " dials " the carrier for the station and circuit required, it then being guided automatically to its destination by means of electro-magnetic devices within the transmission tube. Another arrangement shown by J. W. Halpern & Partners permits twenty send/receive stations to intercommunicate at choice. Several such circuits may be interlinked without an exchange department.

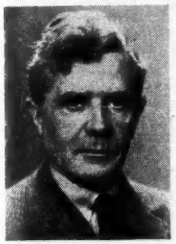
A comprehensive range of Hoover fractional h.p. motors of the protected ventilated type is on view, including split-phase capacitor-start and three-phase machines of $\frac{1}{6}$, $\frac{1}{4}$, $\frac{1}{3}$ and $\frac{1}{2}$ h.p. Switchgear and cam contactors for heavy duty cranes are manufactured by J. G. Smithson & Co., Ltd.

A bag-filling machine shown by Crone & Taylor, Ltd., is of 10 tons per hour capacity and is driven by a 1-h.p. motor. It is mounted on wheels so that it can be pushed forward into the receding heap of material being bagged. Both hand- and motor-driven bar and tube bending machines for from 0·25 up to 12 in. diameter are offered by Commercial Structures, Ltd. Finally Mitchell Engineering, Ltd., has a model actuated by push-button of the Henderson aerial cableway which is working at the Loch Sloy hydro-electric dam site in Scotland.

I.E.E. Elections

New President, Council and Section Chairmen

THIS session's President of the Institution of Electrical Engineers, Mr. Thomas Graeme Nelson Haldane, M.A., M.INST.C.E., brings to the office a wealth of technical and general experience.



Mr. T. G. N. Haldane

Mr. Haldane was born in Edinburgh in 1897, the son of Sir William Haldane of Cloan, Auchterardar, Perthshire, and a nephew of the late Viscount Haldane of Cloan. After attending the Edinburgh Academy he embarked upon a naval career, receiving his training at the Osborne and Dartmouth Royal Naval Colleges. Upon the outbreak of the 1914-18 war he joined the cruiser H.M.S. *Doris* as a cadet. Later he served in H.M.S. *Valiant*, in which he was present at the Battle of Jutland, and H.M.S. *Tiger*.

At the end of the war he retired from the Royal Navy and entered Trinity College, Cambridge, where he read Part I of the Mathematical Tripos and Part II of the Natural Sciences Tripos (Physics) and took an honours degree in 1922. During a further year at Cambridge he was engaged in research work at the Cavendish Laboratory under the late Lord Rutherford. At the same time he was keenly interested in metaphysics and assisted his uncle, Lord Haldane, in his philosophical works on relativity and other matters. He was also for a time president of the Cambridge University Liberal Club.

Mr. Haldane left Cambridge in 1923 to serve an apprenticeship with C. A. Parsons & Co. and while with this company assisted in the erection of the Parsons turbo-alternators at the Barking "A" station. He joined the staff of Merz & McLellan in 1925 and became a partner when Dr. C. H. Merz was killed in an air raid in 1941.

When he joined the firm, with whom he still remains, the 1926 Electricity (Supply) Act was in preparation. Mr. Haldane was a strong supporter of the measure and when it became law he was engaged in helping to put the grid scheme into effect.

More recently he has been concerned with the water power development in the North of Scotland, but in between times he was closely associated with steam power station construction and transmission schemes both at home and abroad, as well as gas-turbine development. During a visit to the United States in 1938 he inspected the Tennessee Valley scheme and stayed at Mr. Roosevelt's home, Hyde Park, discussing power production and other subjects with the President.

Mr. Haldane first served on the Council of the I.E.E. in 1929-31 and was elected vice-president in 1943; he has been chairman of the General Purposes, Papers, and Finance Committees, and is also chairman of the E.R.A. Committee on Large-Scale Wind Power. He has read two papers before the Institution: one (with Mr. J. R. Beard) on city distribution and the other on the heat pump. For these he received the Institution and Kelvin Premiums respectively.

Other Officers

The vice-presidents for next session are Mr. A. J. Gill, B.SC.(ENG.), engineer-in-chief of the General Post Office, and Col. B. H. Leeson, O.B.E., T.D., director of B.E.A.M.A. Mr. E. Leete has been re-elected hon. treasurer.

The vacancies on the Council have been filled by the following:—Members: Mr. S. E. Goodall, M.SC.(ENG.), chief engineer to W. T. Henley's Telegraph Works Co., Ltd.; Mr. H. W. Grimmitt, deputy chief engineering inspector, Ministry of Fuel and Power (Electricity Division); Mr. J. Hall, B.SC., director and chief engineer,

Mr. A. J. Gill and Col. B. H. Leeson, vice-presidents

Troughton & Young, Ltd.; Dr. W. G. Radley, C.B.E., controller of research, G.P.O.; Dr. H. W. H. Warren, managing director of Associated Electrical Industries, Ltd.; and Mr. E. L. E. Wheatcroft, M.A., head of Development

Department, Merz & McLellan. Associate member: Mr. M. W. Humphrey Davies, M.SC. Associate: Mr. A. V. Milton.

The following have been elected as officers and as members of the Committees of the various sections:—

Installations.—Chairman, Mr. R. O. Ackerley; vice-chairmen, Messrs. A. N. Irens and C. T. Melling, M.SC.TECH.; members of Committee, Messrs. J. I. Bernard, B.SC.TECH., C. F. Freeman, B.SC.(ENG.), E. Jacobi and D. P. Sayers.

Measurements.—Chairman, Mr. S. Whitehead, M.A., PH.D.; vice-chairmen, Prof. J. Greig, M.SC., PH.D., and Mr. G. A. V. Sowter, PH.D., B.SC.(ENG.); members of Committee, Messrs. J. F. Coales, O.B.E., M.A., L. B. S. Golds, S. Howarth, J. A. Grieveson, B.A., and L. Hartshorn, D.SC.

Radio.—Chairman, Mr. F. Smith, O.B.E.; vice-chairmen, Messrs. R. T. B. Wynn, M.A., and C. F. Booth, O.B.E.; members of Committee, Messrs. H. G. Booker, M.A., PH.D., L. F. Broadway, B.SC., PH.D., E. Fennessey, O.B.E., B.SC., and E. R. Willis, B.SC.(ENG.).

Transmission.—Chairman, Mr. C. O. Boyse, B.SC.(ENG.); vice-chairmen, Messrs. J. W. Leach and S. E. Goodall, M.SC. (ENG.); members of Committee, Messrs. H. W. Grimmitt, D. B. Irving, B.SC., F. R. Perry, M.SC.TECH., and C. H. E. Ridpath.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE first meeting of system operation engineers of the British Electricity Authority from the several Controls throughout the country was held recently at Bristol. We reproduce a photograph which was taken on this occasion.

Meeting of B.E.A. System Control Engineers

Front Row: Messrs. J. R. Thompson (system operation engineer, Manchester Control), H. F. R. Taylor (senior assistant operation engineer, Bristol), L. B. Law (system operation engineer, Bristol), J. T. H. Legge (divisional controller, South Western Division) and P. J. Squire (system operation engineer, B.E.A. Headquarters, London). Back Row: Messrs. J. A. Bailey (assistant to system operation engineer, Newcastle), H. C. Ogden (senior assistant operation engineer, Leeds), P. W. Cash (system operation engineer, Birmingham), J. G. Bentley (system operation engineer, London), W. S. Wilson (assistant to system operation engineer, Bristol), and J. Stirrett (system operation engineer, Glasgow)

Mr. H. M. Drake, managing director of Drake & Gorham Ltd., and a past-president of the Electrical Contractors' Association, has been appointed a member of the Working Party on Building Operations set up by the Minister of Works. He represents the Federation of Associations of Specialists and Sub-Contractors.

Mr. J. E. Morley has been elected chairman of the I.E.E. South-Western Sub-Centre for the 1948-49 session, with **Mr. A. L. Keet** as vice-chairman.

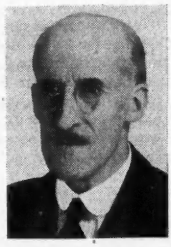
Mr. R. J. Hird has been appointed chief engineer to Mavor & Coulson, Ltd. He will be in charge of production at the company's various works. Mr. Hird, who obtained his B.Sc. degree in mechanical engineering at Glasgow University, served his apprenticeship with Albion Motors, Ltd., and was appointed technical adviser to the design drawing office. Five years after joining Mavor & Coulson he became manager of the Bridgeton works. The management of the Bridgeton works is now to be taken over by **Mr. Jack Neil,** works manager at Sheffield. The vacancy at Sheffield is to be filled by **Mr. David Danks.**

Dr. H. W. Clarke has been re-elected president of the British Non-Ferrous Metals Federation for 1948-49.

On his retirement after forty-six years in the industry a presentation was made to **Mr. R. C. Roberts** at the headquarters of the Midlands Electricity Board on 7th July. Mr. Roberts started with the Exeter Corporation Electricity Department in 1902 and after six years with the Brush Electrical Engineering Co. he joined the S.W. & S. Electric Power Co. in 1910 and

later became chief distribution engineer of the company. The presentation, which took the form of an electric fire, a Rolls razor and a table lamp, was made by Mr. L. A. Jones on behalf of Mr. Roberts' friends and colleagues of the former power company. A small dinner party was also held on 9th July.

Mr. F. J. Bown, M.I.E.E., has been appointed production manager of A. Reyrolle & Co., Ltd., from 1st July. Mr. Bown received his early training with Vickers, Sons & Maxim, Ltd., at Barrow-in-Furness, and joined Reyrolle's in 1912, being employed in the drawing office on switchgear design. After serving in the Royal Engineers from 1914 to 1919 he returned to Hebburn and was appointed assistant works manager. Since 1945 he has been chiefly concerned with the change-over to normal peacetime working with special responsibility for production connected with experimental developments.



Mr. F. J. Bown

Mr. H. H. Hardy, who was first apprenticed to the railway works forty-five years ago and has been chief electrical assistant to the mechanical engineer for the Doncaster area at Doncaster Plant Works since 1933, retired on 2nd July. He was presented with a gold wristlet watch and an engraved silver salver in appreciation of his services.

On 22nd July at the Waldorf Hotel, the members of Council and past presidents of the Electrical Wholesalers' Federation will entertain **Mr. R. W. Smith,** the first president and founder member, to a farewell luncheon on his retirement from the industry. As we announced last week, Mr. Smith retired from his position of managing director of Drake & Gorham Wholesale, Ltd., on 30th June.

Sir Joseph Napier has been elected vice-chairman of the General Cable Manufacturing Co., Ltd.

Professor Sir John Madsen, D.SC., is to retire from the Chair of Electrical Engineering in the University of Sydney (N.S.W.) and the Senate is advertising for a successor at a salary of £1,500 (Australian) per annum. Sir John Madsen was chairman of the Australian Radio Research Board and was knighted in 1941.

Mr. Robert Ferguson, who has been with A. Reyrolle & Co., Ltd., Hebburn-on-Tyne, for twenty years, has been appointed engineer in connection with a new gold mine in South Africa.

At the annual meeting of the **British Welding Research Association** on 8th July the following new members were elected to the Council:—Mr. L. P. Lord, Mr. F. C. Mannox, Mr. J. A. Oriel, Vice-Admiral Sir Charles Simeon and Mr. J. H. N. Thompson. Commander Sir Robert Micklem and Mr. V. E. Greenwood retired from the Council.

The Secretary of State for Scotland has appointed the **Consultative Council for North Scotland.** The chairman is Provost G. T. McGlashan, J.P. (Auchterarder) and the deputy-chairman Treasurer G. R. McIntosh (Aberdeen). Provost McGlashan becomes a member of the North of Scotland Hydro-Electric Board. The other eighteen members of the Consultative Council include Mr. J. McBean, manager of the Queensgate Electrical Co., Inverness.

Mr. W. H. Gamble, B.SC., F.INST.F., formerly regional fuel engineer with the Ministry of Fuel and Power, has formed W. H. Gamble & Partners, heat, power and engineering consultants, with offices at 1, Victoria Street, London, S.W.1.

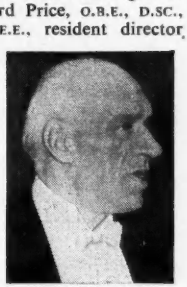
Mr. R. B. Deeley, B.SC., has been appointed a director of Lightalloys, Ltd.

The following awards for 1948 have been made by the **Worshipful Company of Tinplate Workers,** *alias* **Wire Workers**:—Travelling scholarships (value £50 each): Messrs. I. B. Macduff and J. McKillop (Yarrow & Co.), J. Fellows and E. Gregory (International Combustion), R. W. Barrow and P. E. Bacon (Henley's), J. D. Parson (Standard Telephones), W. L. Mead (Enfield Cables), L. G. Evans (Glynhir Tinplate Co.), J. L. Lake (Baldwins King's Dockworks), R. Parr (Harrison & Jones), and J. H. Churchman (Preston Corporation). Prizes of £10 each: Messrs. J. Kinghorn (Yarrow & Co.), J. W. Jacobs (Edison Swan Cables), G. M. Harris (Grovesend Tinplate Works), and N. F. Hood (Great Yarmouth Corporation).

Mr. E. A. W. Whitehead has been appointed sales manager of the home trade organization of the Electroplant Co.

Obituary

Dr. Bernard Price.—We learn with regret of the death of Mr. Bernard Price, O.B.E., D.SC., F.C.G.I., M.INST.C.E., M.I.E.E., resident director in South Africa of the Victoria Falls & Transvaal Power Co. Dr. Price was born in London in 1877 and was educated at St. Dunstan's College, Catford, and the Central Technical College. He went to South Africa in 1909, as chief engineer of the Victoria Falls Co., and held the position of general manager and chief engineer from 1927 to 1936. Before



The late Dr. Bernard Price

joining the company Dr. Price was chief electrical assistant to Merz & McLellan and while with them produced the Merz-Price system of automatic discriminating cut-outs.

Dr. Price was a past-president of the S.A. Institute of Electrical Engineers and of the S.A. Institution of Engineers, a member of the Council of Witwatersrand University and founder of the Bernard Price Institute of Geophysical Research at that University.

Mr. G. E. Barrett.—We are sorry to report the death on 8th July, after an illness lasting several months, of Mr. G. E. Barrett, chief commercial officer, Eastern Electricity Board. Before the electricity supply industry was nationalized Mr. Barrett was commercial manager to the Northmet Power Co. He joined the latter organization in 1932 from Electricity Distribution of North Wales and District.

The late Mr. G. E. Barrett

Mr. E. Hopps.—We are sorry to learn of the death of Mr. Edwin Hopps, former senior charge engineer at North Wilford power station, Nottingham. He joined the staff of the Nottingham Electricity Department in 1902 as engineer-in-charge of Eastcroft destructor station, and retired in 1945.

Mr. H. Wilson.—We report with regret the death of Mr. Herbert Wilson who was chief electrical engineer to the Ashford Urban District Council from 1924 to 1945 when he retired. Mr. Wilson was educated at Faversham and the City and Guilds Technical College. He joined the London United Tramways as a substation attendant in 1903 and later served in the Ipswich, Maidstone, Croydon and Paisley undertakings before going to Ashford.

Commercial Load Spreading

Government Adopts Electricity Sub-Committee's Proposals

IN our issue of 2nd July (page 6) we reported a statement by Mr. Alfred Robens upon steps which it was proposed to take to limit the demand for electricity from commercial (non-industrial) establishments during certain winter hours.

Last week Mr. George Isaacs told the House of Commons that the Government had decided to accept proposals made by the Electricity Sub-Committee of the National Joint Advisory Council to give effect to this. Shops, offices, warehouses, hotels and cinemas would be required to reduce their normal demand by 20 per cent between 8 a.m. and noon and from 4 to 5.30 p.m. during December and January. Regional Boards for Industry had been asked to make the necessary arrangements. They had also been asked to deal with the problem during October, November and March in the light of the special circumstances prevailing in their individual regions.

While the Government was confident that both sides of industry would again co-operate as they did last winter, it was again making available statutory powers to ensure that firms observed their obligations. The regulations would apply also to commercial consumers. It was not necessary to use these powers in one single case last winter, but if they were exercised it would be in the form of a direction to a firm, under the Defence Regulations, to use electricity in such a way that its maximum demand did not exceed a specified amount. Such a direction would only be issued if the Regional Board for Industry concerned and the Electricity Sub-Committee were satisfied that a firm's refusal had been unreasonable. A national committee on which commercial consumers would be represented was being set up by the Ministry of Fuel and Power.

Mr. Isaacs said that the campaign for voluntary reduction in the domestic load during peak hours would continue.

At a press conference on the same day Sir Robert Gould, chairman of the Electricity Sub-Committee, said that what was being asked for was a transfer of power and not "staggering." If the plans worked out as it was hoped, there would not be any "load shedding." He hoped there would be no "dim out" in street lighting.

Mr. J. D. Peattie (British Electricity Authority), a member of the Electricity Sub-Committee, said it was expected that at the present rate of commissioning of plant, generating capacity would catch up with demand in 1952.

Next Week's Events

Monday, 19th July, to Wednesday, 21st July

LONDON.—National Hall, Olympia. First Mechanical Handling Exhibition and Convention.

Wednesday, 21st July

MAIDSTONE.—Royal Star Hotel, 7.30 p.m. Association of Supervising Electrical Engineers, Kent Branch. "Maintenance of Factory Equipment," by A. Carpenter.

MANCHESTER.—Engineers' Club, Albert Square, 7.30 p.m. Association of Supervising Electrical Engineers, Manchester Branch. "Design and Layout of Air Conditioning Plant," by H. Wild.

Saturday, 24th July

LONDON.—Institution of Electrical Engineers, London Students' Section. Agricultural visit to Luton.

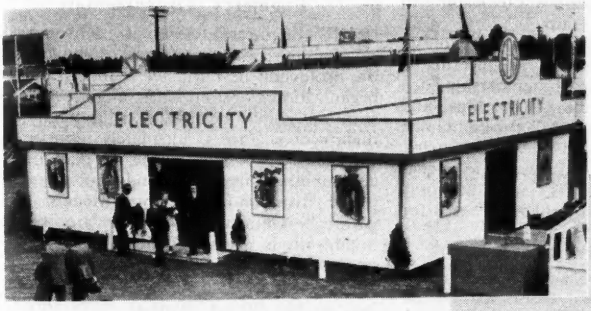
Batti-Wallahs' Society. River trip from Westminster to Thames Estuary.

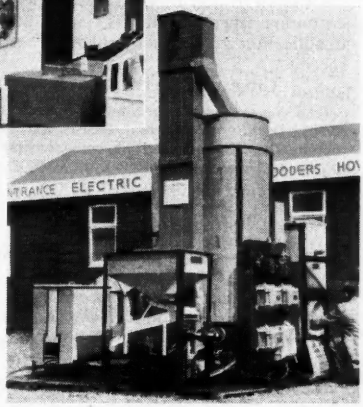
Agricultural Shows

Displays at York and Watford

THE electric farm exhibited by the British Electrical Development Association in conjunction with the North-Eastern and Yorkshire Electricity Boards attracted thousands of interested visitors at the Royal Show at York last week. The principal visitor was Her Royal Highness the Princess Royal who on Thursday last spent forty minutes touring the farm.

Unlike most exhibits at the show which were of the exhibition stand type the electric farm allowed the visitors to walk about freely from one farm building to another and spend as much time as they cared at the section which interested them most. By practically every appliance they found an expert, either a representative of one of the Electricity Boards or of the manufacturer who was able to explain its workings and advantages.





Parts of the electric farm arranged by the British Electrical Development Association at the Royal Show, York. On the right is a "Lincoln" all-electric grain dryer

The Princess Royal who was accompanied by Sir Rowland Burke, the honorary director of the show, was met at the entrance to the farm by Mr. J. A. Prowse of E.D.A., who conducted her round the farm. She was particularly interested in the dairy and electric soil warming sections, while the large display of electrical appliances appeared to interest her immensely. Before leaving the domestic division the Princess Royal was asked to accept a memento of her visit and she selected a Premier electric iron.

Hertfordshire Show

The electrical stand at the Hertfordshire show is always one of the main centres of attraction. The display last Wednesday at Cassiobury Park, Watford, was no exception and the Eastern Electricity Board included practically every modern electrical appliance now available to assist farmers in their work. In the dairy section there were to be seen a milk cooler, a cold room, a milking machine, a storage water heater, sterilizers, electrode steam raisers, bottle washers and filling machines, milk abnormality indicator and an electric milk pram.

Models of hay finishing and grain drying plant were of special interest in the exhibit of farm machinery, which also included a food mixer, "Essex" mill, "Economill," grain conveyor, hoist, chain block and seed conditioner. For poultry keepers there were incubators, brooders, hovers, egg testing and grading equipment, while soil warming and sterilizing equipment attracted considerable attention in the horticulture section, where there were model greenhouses. Other particularly interesting items were special pumps for nursery use, irrigation plant, forced-draught equipment, a hedge trimmer and a tomato grader.

Water supplies are of particular importance on a farm and four different types of pumping equipment were shown. There was also a comprehensive display of workshop equipment including grinders, drills, welding plant, battery chargers, vulcanizers, sheep shearers, horse and cattle clippers, a de-horner, a portable forge, an air compressor and an electric fence.

The farmhouse was not overlooked and among examples of domestic electrical appliances were refrigerators, washing machines, a wash-boiler, vacuum cleaners, cookers, water heaters, infra-red and ultra-violet units, toasters, a kettle, irons, a floor polisher and clocks.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Technical Qualifications

I SHALL be grateful if any of your readers can give me one sound reason why members of the technical staffs of nationalized industries should continue to pay subscriptions to the learned societies such as the Institution of Electrical Engineers, bearing in mind that unlike the contents of the artisan's tool bag, they do not rank for income-tax relief and—

(*a*) Senior posts are being obtained without the candidates having or at the most requiring only qualifications leading to corporate membership.

(*b*) For junior posts it is apparently sufficient to be studying engineering.

(*c*) All the advantages of membership such as the attendance at lectures and receipt of the journal can be obtained without this expense.

I hasten to add that I am well aware that corporate membership is not the only qualification a competent engineer needs for success.

CHARTERED ELECTRICAL ENGINEER.

[Income tax relief is granted in respect of subscriptions to professional institutions where membership is regarded as an essential condition of employment. — Editors, *Electrical Review*.]

Simmering Device

THE simmering appliance described by Mr. F. C. Platt in your 2nd July issue seems to be a complicated piece of mechanism when one considers that it is an alternative to moving the pan half off the hot-plate and achieving similar results.

Harrow, Middx. E. H. MALTBY.

That Poster

A FURTHER devastating criticism has fallen upon that much-publicized household in which "Mummy Forgot to Switch it Off." In the House of Commons and elsewhere, pointed remarks had been made about the light switch being already off, about Daddy and not Mummy being the offender and about the mountaineering hazards of Junior.

Now comes no less a worthy than Mr. T. C. Gilbert assailing the inoffensive three-pin socket on the skirting-board—not, mind you, because there is no earth-leakage-switch, but because it's just an irregular switch-and-socket unit in a "live" state. Unapproved though this type of unit may be, it was fixed by a very estimable and hard-working local "electrician"—recommended to Daddy by a friend who works in the same office as the spare-time wireman. Authority does not prevent the installation of such unapproved gear or helpful actions. So what, Mr. Gilbert? STAN DARD.

Engineers' Organizations

THE Engineers' Guild is active again seeking new members. Why should the profession be burdened with yet another organization? Surely the engineering institutions should be capable of upholding the dignity of engineers, adequately representing them at "the highest levels of planning of control and direction," and protecting the public from unqualified practitioners. Regarding remuneration, there are several organizations whose function is to take care of such matters.

The Guild occasionally likens its organization to the British Medical Association, a singularly unfortunate choice since I cannot imagine engineers, who are by nature independent spirits, submitting to an autocratic body. H.H.

New Amplifier-Oscillator

IT is announced by *Reuters* from New York that the Bell Telephone Laboratories have produced a very small device which is stated to perform nearly all the functions of ordinary thermionic valves. When used in place of the latter in a radio receiver, the "warming-up" delay is eliminated because there is no filament; it may also be employed for the purpose of amplifying telephone conversation and television patterns.

The device, called the "Transitor," is said to consist of a pinhead-size piece of germanium (a zinc by-product) in contact with two thin wires (0·002 in. apart) causing an amplification of 100 times between the input and output wires. The device is still in the laboratory stage, but its very small power consumption seems likely to render it adaptable to hearing aids, which would then need much smaller batteries.

COMMERCE and INDUSTRY

Manufacturers and Purchase Tax. Railway Electrification.

THE Chancellor of the Exchequer is being asked by the National Union of Manufacturers that the new powers under the Finance Bill to vary purchase tax at any time by an Order shall not be used without consultation with the industry concerned. In its communication the N.U.M. points out that the possibility of a change in the rate of purchase tax creates difficulty for the manufacturer in deciding the extent of his production, the nature of goods to produce and the introduction of new products vital to the country's industrial well-being.

Instrument Jewels

The dimensions of instrument jewels are the subject of BS.904 which has been revised at the request of the Ministry of Supply primarily to enable modified designs to be substituted for the three types of compass jewels which are included in this specification. Other types covered are stones (ring and end) and V-jewels in respect of which only minor modifications have been made. This standard does not apply to cup jewels for integrating meters, or to bearing jewels for clocks and watches. Copies are obtainable for 2s. post free from the British Standards Institution, 24, Victoria Street, London, S.W.1.

Crompton Cable Works Extension

To increase the output of "Crompton" cables for export the Derby Works of Crompton Parkinson, Ltd., are now being extended by the addition of a new bay which will be equipped with the latest cable-making machinery. The Derby extension is part of a long-term programme of expansion and development of the company's group of factories devoted to a wide range of electrical products.

Manchester-Sheffield Electrification

During a tour of the Eastern Region of British Railways, Sir Cyril Hurcomb, chairman of the British Transport Commission, announced at Sheffield last week that electric traction was expected to be introduced between Wath and Dunford in March, 1951, and from Dunford to Manchester (London Road), including the new repair depot and car sheds at Reddish, in March, 1952. The third and fourth stages, which include Sheffield to Barnsley Junction and Levenshulme to Manchester (Central), will, it is expected, both be completed in December, 1952. The scheme will cost over £6,000,000 and will save 100,000 tons of coal per annum.

For hauling the passenger and freight trains eighty-five 1,860-h.p. mixed traffic electric locomotives will be built, twenty-eight of which will be fitted with electrically heated boilers to provide steam heating when hauling passenger trains. One mixed traffic electric locomotive has been completed and is at present being tested in Holland, where it has covered satisfactorily 55,000 miles to date, hauling passenger and freight trains on the Netherlands Railways. For the passenger train services, existing coaches will be used except on the local services between Manchester (London Road), Hadfield and Glossop, for which eight 3-coach multiple-unit trains are to be built, using the 1,500 V d.c. overhead system.

Employment in April

The number of insured persons employed in the electrical engineering industry in April was 161,700 according to the monthly analysis published in the *Ministry of Labour Gazette*. This was slightly higher than in the previous month (161,000). In electrical wiring and contracting the number employed was 62,700 against 62,400 in March, but in the manufacture of electrical apparatus, cables, etc., there was a decrease on the month from 281,900 to 279,400.

X-Ray Equipment for Poland

To mark the presentation of £3,500 worth of X-ray and electro-medical apparatus to the Children's Clinic of Poznan University, Poland, by the General Sikorski Memorial Hospital Fund, a ceremony was held last week at Century House, Shaftesbury Avenue, the headquarters of Philips Electrical, Ltd., makers of the equipment. The Polish Ambassador, representing Poznan University, received an illuminated scroll commemorating the event which was presented to him jointly by Mrs. E. d'A. Willis and Major Rowland Sanders, trustees of the Fund. The equipment consists of a D.X.4 four-valve X-ray unit rated at 500 mA, 85 kV peak, complete with U.S.5 motor driven couch; X-ray accessories and dark room equipment; and a "Philistat" electro-therapeutic unit with a set of electrodes.

B.T.H. Summer School

An important factor in the training of engineers is the balance between academic and practical training. These two sides have been brought together this week at Rugby where professors of electrical engineering and their colleagues from the Department of Scientific and Industrial Research, the National Physical Laboratory and the Institution of Electrical Engineers have been attending a Summer School at the works of the British Thomson-Houston Co., Ltd. The dual object has been to bring before university professors the latest methods of approach to problems concerning the electrical engineer; and, by

means of discussions and informal talks, to guide the industrial workers with views and suggestions from their academic colleagues. The syllabus has included more than twenty lectures by the company's engineers and research workers. The School was organized by a committee under the chairmanship of the director of research and education, the members including the directors of electrical and mechanical engineering and the manager of the Education Department.

Revised Import List

The Board of Trade has issued a new consolidated list of import restrictions, the "Control of Imports into the United Kingdom, Notice to Importers No. 292," copies of which can be obtained from the Import Licensing Department, Board of Trade, 189, Regent Street, W.1.

Contractors' Charge-Hands' Pay

The National Joint Industrial Council for the Electrical Contracting Industry has agreed to an increase in the minimum rate for charge-hands from 2d. to 2½d. per hour to take effect on 3rd August.

Instrument Transformer Errors

A useful booklet of 17 pages illustrated with diagrams, published by Elliott Bros. (London), Ltd., Century Works, Lewisham, London, S.E.13, should be of service to test engineers as a guide to the corrections which need to be made when conducting electrical measurements for the errors introduced by the use of instrument transformers. It has been prepared by Mr. H. D. Hawkes (of the company's research laboratories) in conjunction with Mr. H. S. Petch (B.E.A.) without claim to original work on the subject. Their endeavour has been to set out simply, but comprehensively, such information as is necessary to explain how to measure such errors and enable allowances properly to be made for them.

London Metal Exchange

A scheme for the reopening of the London metal market was placed before representatives of producers and consumers of non-ferrous metals at a meeting of the London Metal Exchange last week. The chairman said that a plan had been submitted to the Ministry of Supply and it was hoped to discuss it with him. Hitherto the Minister had held that currency difficulties and scarcity of supplies had made it impossible to reopen the market but the Committee considered that these difficulties could be overcome. It was not anticipated that there could be an immediate "free" market. Tin supplies would remain within the existing allocation scheme and other non-ferrous metals would still come within the present system of domestic licensing and export permits.

The aim was, however, to secure a greater degree of flexibility in tin allocation and the licensing of other metals. An open market, even within these limits, would give a more accurate idea of conditions governing supply and demand and prices would be more truly representative of world values.

Indian Inquiry for Plant

Details have been received from the Export Promotion Department of the Board of Trade of an inquiry from the Director of Industries for the Punjab Government for machinery, plant and equipment required in connection with a rehabilitation scheme for refugees. Among the items covered are electric motors, welding sets, power tools, electro-plating plant, cranes and ice-cream machines.

Telecommunication Terms

The many specialized terms that have come into use in connection with radio waveguide technique (guided transmission) were not dealt with in the 1943 revised edition of the glossary of terms used in telecommunications (BS. 204). Supplement No. 1 (1948) has therefore been prepared with the object of standardizing the nomenclature in this branch of short wave communication. Copies are obtainable for 2s. post free from the British Standards Institution, 24, Victoria Street, London, S.W.1.

Buyers and Representatives

The Engineer Buyers and Representatives Association, formed about a year ago, has issued an interim report reviewing the progress made. Offices have been secured at 47, Victoria Street, London, S.W.1, memorandum and articles of association drawn up and an emblem designed. The first president of the Association is Sir Herbert Williams and the vice-presidents are Mr. C. E. Allen and Mr. L. E. Van Moppes. Mr. L. C. Thornton is honorary treasurer and Capt. A. J. Dronfield general secretary. Branches are being formed in London and the Home Counties and in the Midlands at which regular meetings will be arranged.

Yugoslav Electrical Production

The Yugoslav electro-technical plant "Rade Konear" has started the production of generators and transformers. Hitherto, all such equipment had to be obtained from abroad. It is intended to expand the plant, situated at Zagreb, so that, eventually, it will be able to supply all the equipment required by Yugoslavia's power stations. The production of larger transformers and generators is to start next year, as well as that of industrial motors, especially for the metallurgical industry.

Non-Ferrous Metals Federation

The annual meeting of the British Non-Ferrous Metals Federation was held in Birmingham last week when the president, Dr. H. W. Clarke, reported that the number of federated bodies was now seventy-four. Reviewing the

year's activities, he said that the Federation had not ceased to emphasize the disadvantage at which it was placed by the prices at which non-ferrous metals were sold to them by the Ministry of Supply in relation to the world prices at which their competitors could buy. With regard to the level of metal consumption, they viewed with some anxiety the continued shortage of high grade zinc.

Tube Railways for Goods

The construction of automatic tube railways—similar to that of the G.P.O.—for goods traffic in order to reduce street cartage is suggested as worthy of investigation in the Final Report to the Minister of Transport of the Railway (London Plan) Committee. Examining proposals in the County of London Plan for dealing with railway terminals north of the Thames, other than those of the Southern Region, the Committee advises against the removal of Liverpool Street Station and suggests the building of a two-level station on the existing site.

Plastics Materials Supplies

The Board of Trade announces that the Plastics Materials Section of the Raw Materials Department has moved to I.C. House, Millbank, London, S.W.1 (telephone: Whitehall 5140, Ext. 387).

Possibilities in Turkey

In the course of an Overseas Economic Survey dealing with Turkey (H.M. Stationery Office, 4s.), Mr. E. R. Lingeman, Counsellor (Commercial) at the British Embassy, Ankara, says that the country offers a good market for vacuum cleaners, thermostatically-controlled irons, toasters, fires up to 1 kW, portable boiling plates, fans, refrigerators, fluorescent lighting and small motors. British manufacturers of these appliances should have no difficulty in selling to Turkey for some time to come; many British manufacturers have, in fact, recently established agencies in Istanbul. There is no market for electric washing machines, immersion heaters or office telephones.

Diesel-driven generating sets of from 50 to 250 h.p. are used in provincial towns for supplying electricity. Smaller sets are used in mills and factories and the military authorities use small petrol sets. The engines are mostly of the vertical high-speed type supplied by Continental makers.

Electrical Manufacture in France

Prospects for the electrical manufacturing industry in France were reviewed by M. Hallopeau, of the General Electric Construction Syndicate, at a recent press conference, states our Paris Correspondent. M. Hallopeau said that in 1947 the total number of people employed in the electrical manufacturing industry was 179,000 against 136,000 in 1938. Overall production was 50 per cent greater than in 1938, but in some sections the increase was higher. For example, the number of motors manufactured had risen from 140,000 to 380,000.

Exports had increased from 691 million francs (4,125 tons) in 1946 to 1,830 million francs (8,740 tons) in 1947. The main countries concerned were Belgium, Holland, Switzerland, Syria, Lebanon, Sweden, Norway and India. Material exported included motors, transformers, accumulators, domestic apparatus, medical and radiological installations, measuring apparatus, counting machines, lamps, radio material, wire and cable, and telephonic and telegraphic material. With a view to developing exports, the French industry had taken an active part in the organization of a number of exhibitions abroad, notably in Stockholm, Milan, Buenos Aires and Barcelona. M. Hallopeau stated that efforts were being intensified to meet the great demand for electrical equipment, and although lack of foreign currency was a problem for the industry, it was hoped that Marshall Aid would help considerably to solve it.

India Relaxes Import Controls

The Government of India has removed control over imports of certain categories of goods from sterling and other soft currency countries by allowing their import under an open general licence. Items affected include cable and conduit accessories, graphite and carbon electrodes, certain specified electrical instruments, electrical exploders, safety lamps and electro-medical apparatus.

Australian Telephone Factory

Four British firms and one American are to join forces to establish a £500,000 factory to produce telephone equipment for Australia's 17,000 would-be subscribers who are waiting for office and house 'phones.

Australian Electrical Trade

During the nine months ended 31st March last imports of electrical appliances and equipment into Australia amounted to £A6,837,500, compared with £A3,973,000 in the corresponding period of 1947. Exports also rose from £A621,000 to £A841,000.

Builders' Reference Book

The second edition of the Architects', Builders' and Civil Engineers' Reference Book, which has some 880 pages and over 750 illustrations, is now available from George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2, price 52s. 6d. Several hundred pages have been added to the original edition to include materials, special constructions and building equipment which have recently become available. The book provides a survey of established practice, progress and development

in building and construction work, although in Section 4 on engineering services, electrical equipment does not seem to have received adequate treatment. For example, the standardized 13-A plug and socket outlet (B.S.1363) which was omitted from the first edition is still not mentioned.

Wind-power Experiments

Mr. J. Venters of the North of Scotland Hydro-Electric Board and Mr. E. W. Golding of the British Electrical and Allied Industries Research Association are visiting Orkney with a view to finding a suitable site for a wind-driven generator. It is not expected that any generating equipment will be installed for at least two years, the whole scheme being still in early experimental stages.

Higher Steel Output

Figures published by the Iron and Steel Federation record that steel output in June was equal to a rate of 15,444,000 tons per annum, the highest in the history of the industry. For the six months to 30th June production amounted to 7,564,000 tons, indicating that output is running above the revised Government "target" of 14,500,000 tons although allowance must be made for the usual decrease during the holiday period.

Annual Holidays

Vidor, Ltd., are closing their factories for the receipt of goods from 23rd July to 3rd August (4th August at Erith).

The works of the Morecambe Electrical Equipment Co., Ltd., will be closed from 23rd July to 3rd August.

The works of Mitchell Electric, Ltd., will be closed from 24th July to 3rd August both dates inclusive.

Trade Announcements

The Wholesale Fittings Co., Ltd., has moved to new premises at 30/34, Colston Street, Bristol, 1 (telephone 25231/2).

National Plastics, Ltd., announce that their two operating companies, British Moulded Plastics, Ltd., and Moulded Products, Ltd., have appointed the Laycock Engineering Co., Ltd., Victoria Works, Millhouses, Sheffield, 8, as their sole selling agents to the railway authorities in Great Britain and Northern Ireland.

J. P. Isaacs, Ltd., 80, Church Road, Acton, W.3, have been appointed selling agents in London and the Home Counties for the "Mason Master" tungsten carbide tipped wall drills which are produced by J. M. Perkins & Smith, Ltd.

Thorn Electrical Industries, Ltd., state that in future their offices and stores will be closed all day on Saturdays.

Trade Marks

APPLICATION has been made for the registration of the following trade marks. Objections may be entered within a month from the date shown:—

30th June

BULL. No. 655,598, Class 7. Electric motors.—E. R. & F. Turner, Ltd., Foxhall Works, Ipswich.

CYROS. No. 656,162, Class 9. Electric terminals for sound receiving and transmitting apparatus; telephonic and telegraphic instruments; and microphones.—R. B. Ross and C. Ross, trading as Ross Bros., 182/4, Cleethorpes Road, Grimsby.

SHEDNOUGHT. No. B658,949, Class 9. Electric storage batteries.—Pritchett & Gold & E.P.S. Co., Ltd., Dagenham Dock.

SAREF. No. 659,374, Class 9. Electrical apparatus and instruments included in Class 9.—Saref Electrical Appliances, Ltd., 1, Devonshire Square, Bishopsgate, London, E.C.2.

TINKABELL. No. 659,583, Class 9. Electric switches, switch-boxes and switch-housings.—J. Evans, Llanaber, Cilcain, Flintshire.

AIDAS. No. 660,238, Class 11. Electric water heating apparatus.—Aidas Electric, Ltd., Sadia Works, Rowdell Road, Northolt.

7th July

E.M.I. (design). No. B644,560, Class 7. Electric drying, washing and ironing machines, and parts (not included in other classes) of all such machines. No. B644,561, Class 9. Electric scientific instruments and apparatus, apparatus and instruments for recording, reproducing, receiving and transmitting sound, television apparatus, electron discharge devices, electric vacuum cleaning apparatus, dust extractors, flat irons, electric kitchen utensils included in Class 9, cinematographic apparatus and optical, weighing, measuring and signalling apparatus and instruments, and parts (not included in other classes) of all the said goods, etc. No. B644,562, Class 11. Refrigerating machines and installations, electrical apparatus for heating, cooking, lighting, drying and ventilating; and parts (not included in other classes) of all the said goods.—Electric & Musical Industries, Ltd., Blyth Road, Hayes, Middlesex.

CASTLE (design). No. 660,167, Class 9. Electric coffee percolators and kettles.—C.S.A. Industries. Ltd., Wharf Street, Warwick.

LA SIRENE. No. 661,037, Class 10. Electrical instruments and apparatus for surgical and curative purposes.—Osborne, Garrett & Co., Ltd., 51-54, Frith Street, London, W.1.

VACTRIC. No. 657,253, Class 11. Electrically operated installations and apparatus for heating, lighting, drying, refrigerating and ventilating, and parts of all such goods, all being included in Class 11.—Vactric, Ltd., 1, Langham Place, London, W.1.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

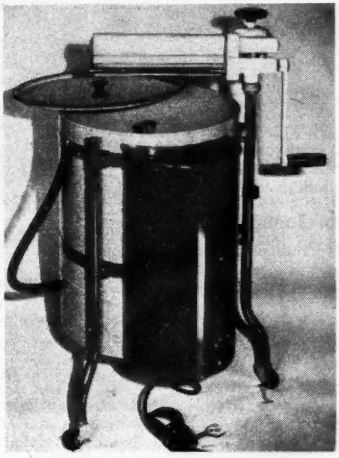
Combined Table Lamps and Clocks

VARIOUS models of combined table lamps and electric clocks are now available from SMITHS ENGLISH CLOCKS, LTD., 179-185, Great Portland Street, London, W.1. Floral and geometrical designs in wrought-iron are particularly attractive, as are also the shades.

One of a new range of combined table lamps and electric clocks

Washing Machine

A washing machine marketed by FLEET ELECTRICS, LTD., 32-34, Willesden Lane, London, N.W.6, is finished in pastel and dark green with plated "trimmings." Its vitreous-enamelled 16-in. diameter tub has a capacity of nearly 10 gal and there are two commodious bins (18 in. by 12 in.) attached for holding soiled linen, etc. The four-vaned agitator is driven by a quietly running motor: the wringer is hand operated. Castors facilitate movement.



Fleet electric washing machine

Coffee Percolator

A new coffee percolator, at present for export only, is announced by BEST PRODUCTS, LTD., Felixstowe. A special feature is a two-position switch which enables coffee to be kept hot without further percolation or evaporation. A thermal safety device is fitted.

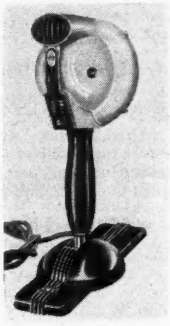
Best Products coffee percolator

Leather Substitute

An alternative fabric to leather, natural or artificial, used by instrument makers and other electrical manufacturers is being imported by SIMCO PLASTICS, 22 St. Giles High Street, London, W.C.2. It is available in five plain colours. Minimum quantity supplied in one colour is 25 rolls of 40 yd, each 39/40 in. wide.

Hairdryer

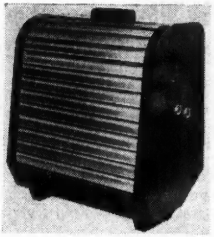
Breaking away from the conventional "pistol" shape an attractive new hairdryer which is at present available (for export only) is being produced by H.M.V. HOUSEHOLD APPLIANCES, Hayes, Middlesex. This new model has a carefully balanced streamlined moulded body and handle, designed to cause much less fatigue to the user. Fatigue is further obviated by the provision of a stand to hold the dryer in position on a table or shelf. Finger-tip switches are provided in the body of the dryer to control the fan and heating element separately. The dryer weighs 2½ lb and has a loading of 600 W.



H.M.V. hairdryer

Fan-Heater

A combined fan and fire made by H. FASS & SON, LTD., 10, Byron Road, Wealdstone, is useful all the year round. A rotary switch gives two heating positions and one operating the fan only, red or green lights shining through coloured metal louvres in the front of the apparatus according to whether warm or cool air is emanating. Although the cabinet is of walnut, risk of fire is avoided by keeping the black-heat elements well away from the woodwork and also by spraying the inside with a heat-resisting material. As a further precaution two soft-solder fuses



on the chassis melt if a certain temperature is exceeded. The unit can be lifted out completely on its chassis.

The " Fanfire "

The " Fanfire," as the apparatus is called, has a two-position base enabling it to be used upright or sloping backwards at an angle of 45 deg.

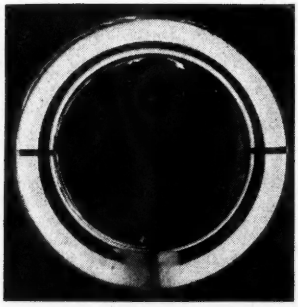
Diecast Conduit Fittings

A range of diecast conduit fittings has been added to the products of CLANG, LTD., Crown Yard, Cricklewood, London, N.W.2. Conduit boxes, hands, elbows and interchangeable covers are included, finished in black enamel and designed to fit $\frac{5}{8}$ in. and $\frac{3}{4}$ in. conduits.

Circular Fluorescent Lamps

Circular fluorescent lamps and associated fittings are now produced in this country by HAMILTON & CO., 109, Shaftesbury Avenue, London, W.1.

At present, 40- and 80-W lamps are in the form of a 16 in. diameter circle, the 80-W size being fabricated from 1·5 in. and the 40 W from 1 in. diameter glass tubing.



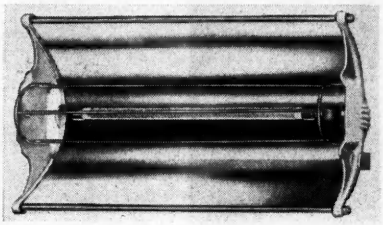
Longlamps 14-in. circular fluorescent fitting

The fittings consist of an 18 in. " Perspex " acrylic plastic disc on top of which is mounted a spun aluminium dome in which the control gear is situated. Attached to the apex of the dome is a length of 0·75 in. " Duralumin " conduit terminating in a ceiling-rose cone.

A circular fitting, 14 in. in diameter, suitable for a 30-W fluorescent lamp is also obtainable from LONGLAMPS, LTD., 24, Marshalsea Road, London, S.E.1. It is constructed of polished aluminium, the starting unit being accommodated in the central portion which projects 3 in. from the ceiling. Other fittings are made to take 5 ft 6 in. 120-W and 8 ft 6 in. 240-W high voltage circular neon fluorescent tubes. The company can also supply from stock 20-W 2 ft fluorescent tubes and starter gear.

Wall Fire

A new 1-kW " Clem " wall fire, made by CLAYTON LEWIS & MILLER, LTD., Clem Works, Manilla Road, Southend-on-Sea, incorporates an adjustable reflector and pressure diecast chassis. It is specially designed for easy fixing



" Clem " wall fire

to walls and is very suitable for children's nurseries, etc.

Capacitors for Flash Photography

Recent developments in the field of flash photography and stroboscopy have created a demand for reliable capacitors of compact dimensions and light weight. This is met by the " Hikonol " range manufactured by the TELEGRAPH CONDENSER CO., LTD., North Acton, London, W.3, which is intended for use with 100 Joule discharge tubes. At present, capacitances of 28 and 33 μF $\pm$ 20 per cent are available, for 2·5 kV d.c., intermittent operation or 2 kV d.c., maximum static operation.

Automatic Soldering Iron

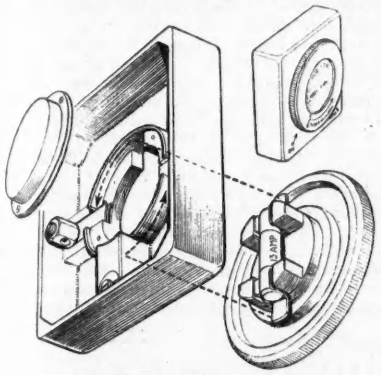
An automatic soldering iron, the magazine of which holds 20 ft of resin cored solder, is being manufactured under the name of " Autofeed " by RUNBAKEN ELECTRICAL PRODUCTS,

" Autofeed " soldering iron

71-73a, Oxford Road, Manchester, 1. It is rated at 60 W and has a chromium plated finish.

Domestic Fuse Unit

The provision of a separate local fuse for each domestic socket outlet is facilitated by a single-pole unit now available from the RADIAMP CO., LTD., Farningham Road, Tottenham, London, N.17. Originally produced for the London County Council, this device is moulded square in shape for surface mounting, the approximate overall dimensions being 3·1 in. by 3·1 in. by 1·1 in. The cartridge fuse may be rated up to 13 A. The carrier is easily removable for fuse replacement by rotating the flange through 60 deg in an anti-clockwise direction. It is virtually impossible, even for a child, to touch line contacts with the fingers.

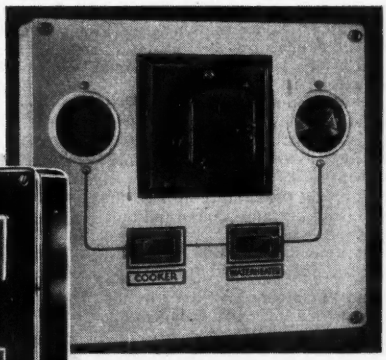


Exploded view of the Radiamp domestic fuse unit

Cooker Control Units

To assist in limiting the domestic load several cooker control units making their appearance permit the use of either the cooker or a water heater, but not both.

In the compact new "Clix" unit made by GENERAL ACCESSORIES CO., LTD., 21, Bruton Street, London, W.1, both the 30-A change-over switch and the 15-A double-pole switch controlling the auxiliary circuit for kettle, etc., are of the "Surrey" micro-break type. A novel ejection device simplifies the replacement of fuses.

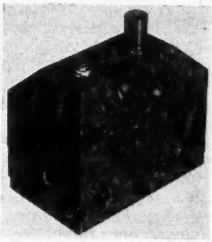


"Clix" (left) and Metalform cooker control units

Two 30-A double-pole "Wylex" switches which are interlocked so as to prevent the simultaneous use of the cooker and water heater, are incorporated in another unit made by METALFORM, LTD., 258, Gray's Inn Road, London, W.C.1, together with an M.K. 3-pin shuttered socket outlet to B.S. 1363. The company also produces a smaller control unit comprising a 30-A double-pole cooker switch and a 3-pin shuttered socket outlet to B.S. 1363, mounted in an enamelled metal box.

Time Delay Switch

A time delay switch made by the LABOUR-LESS PRODUCTS CO., 81, Chertsey Road, Woking, though designed specially for use with toasters, has many other applications. Any setting from 1 sec. to 60 min. is readily obtainable by the adjustment of a screw accessible from the outside, frictionless rubber bellows minimizing change in setting due to air temperature variations.



Automatic time delay switch

Snap-action silver contacts are designed to give high current rating. The dimensions are 3¾ in. by 2¼ in. by 2⅜ in.

Fluorescent Lighting Accessories

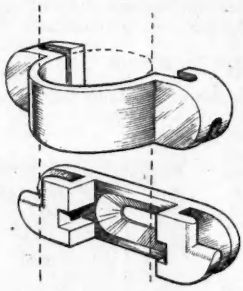
The PLESSEY CO., LTD., Ilford, now has a range of fluorescent lighting control units for all standard tubes from 20 W to 80 W, provision being made for series twin and single lamp installation on 50 c/s mains. They are housed in bitumen-filled pressed aluminium cases,

shaped for inclusion in most patterns of fluorescent fitting. Loose leads have been eliminated and all connections are made to a terminal block which is conveniently mounted to give easy access.

In the moulded holders which have been developed by the same company for bi-pin tubular fluorescent lamps, the lamp itself is held in position by steel springs. The pins are thereby relieved of all weight and make efficient connection with the contact springs. Installation is simple and the lamp cannot fall out.

Conduit Clip

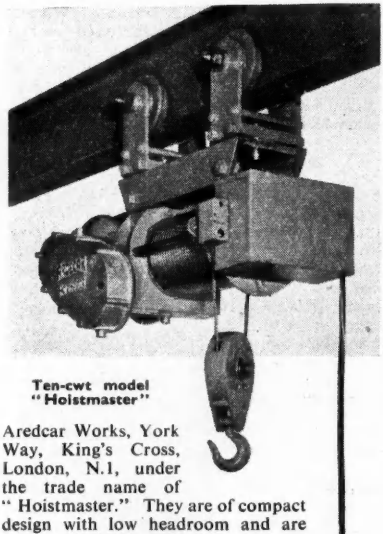
The production of die cast alloy clips for conduit tubing in sizes from $\frac{5}{8}$ in. to 1 in. is now being carried out by A. ROBINSON & CO., LTD., Knowsley Road, Liverpool, 20. The "Barclip," as it is called, requires only one fixing screw and consists of two components of an automatic lock which is completed simply by pressing the separate parts together by hand.



The "Barclic" conduit clip

Electrically Driven Hoists

A RANGE of hoists handling from 5 cwt to 5 tons (250 to 5,000 kg) and with a maximum height of lift of 20 ft (6 metres) is now in course of manufacture by R.D. CARDIFF, LTD., Aredcar Works, York Way, King's Cross, London, N.1, under the trade name of "Hoistmaster." They are of compact design with low headroom and are easy to maintain. Motive power is obtained from a totally enclosed three-phase, high-torque, squirrel-cage induction motor on the shaft of which is an electro-mechanical brake to give accurate control over movement. The full load lifting speed varies from 40 ft/min (12 metres min) on the smallest model to 12·5 ft/min (4 metres/min) on the largest. An automatic limit switch is fitted and a lowering switch can also be incorporated if required.



Ten-cwt model "Hoistmaster"

The bogie chassis is adjustable to operate on alternative girder sizes and can be supplied complete with collector gear when specified. All models can be supplied with either fixed suspension, push travel (except 2 to 5 ton models), electrically powered or hand chain travel. Because of the worm reduction drive the load cannot take control in the event of a breakage or power failure. The worm drive is oil immersed and runs in an enclosed casing.

As a result of experience gained by its American associates, the YALE & TOWNE MANUFACTURING CO., LTD., Willenhall, is now producing an all-British electric hoist, the "Wizard." Special features are its simplicity of design, portability, strength and durability despite light weight, ease of operation and maintenance, and high speed. The wiring, controller and brake are all totally enclosed, and there are positive upper and lower limit stops.

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Dorset House, Stamford Street, London, S.E.1

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Johnson, Matthey & Co., Ltd.—Last year the value of the company's export sales of manufactured products was seven times the peak pre-war figure. Stating this at the annual meeting of the company, Mr. H. W. P. Matthey (chairman) said it had been achieved despite increasing currency and other difficulties, many of which he feared were coming to be regarded as inevitable and permanent. Indicating that the company did not believe in such a continuous state of affairs, he said that since the end of the war one or another of the directors or managers had visited each country with which it was possible to do business.

Crompton Parkinson, Ltd., announce that 94 per cent of the recent issue of 1,025,932 "A" ordinary shares of 5s. each at 20s. per share was taken up as "rights." The balance of shares available (63,529) has been covered by applications for 1,325,632 additional shares.

Walsall Conduits, Ltd.—Speaking at the recent annual meeting Mr. A. E. Read (chairman), said that 1947 had been the most trying year in the history of the company. During the year under review the tube mill had frequently been idle owing to lack of steel. Fortunately it had been their practice in the past to keep abreast with new and improved methods of production and this policy had served them well. Their order book was full, and if sufficient labour and supplies of raw material could be made available they could substantially increase their output and effect price reductions.

The Telegraph Construction & Maintenance Co., Ltd., has declared an interim dividend of 5 per cent (same).

Hoover, Ltd., is maintaining its interim dividend at 10 per cent.

New Companies

J. & L. V. Walsh, Ltd.—Registered 30th June. Capital, £3,000. To acquire the business of G. H. Cartwright & Co., at Palm Grove, Birkenhead, electrical engineers and factors, manufacturers, repairers and dealers in electrical appliances, etc. Permanent directors: Julia Walsh and L. V. Walsh (managing director). Regd. office: 33, Palm Grove, Birkenhead.

Nagard, Ltd.—Registered 30th June. Capital, £18,000. To acquire the trade mark "Nagard," other assets and goodwill of International Television Corporation, Ltd., and to carry on the business of electrical and mechanical engineers, radio and television engineers, etc. Permanent directors: A. O. Hinchliffe (director of Watliff Co., Ltd.), A. F. J. Wright (director of Davis & Timmins, Ltd., etc.) and F. Nagy. Regd. office: 63-4, New Broad Street, E.C.2.

Energy Batteries (Eire), Ltd.—Registered in Dublin 24th June. Capital, £3,000. Engineers, manufacturers, agents and dealers in batteries and electrical equipment of all types, etc. Subscribers: J. McGrath, 1, Ardgowan Street, Blackhall, Paisley, and W. Moohan. Secretary: J. J. Connington.

Cambridge Dielectrics Co., Ltd.—Registered 30th June. Capital, £100. Manufacturers and dealers in ceramic products, electric insulation materials, etc. Directors: H. C. Bagnall (managing director), K. Kinniburgh and E. E. Shaefer. Secretary: K. Kinniburgh. Regd. office: 124, Sloane Street, S.W.1.

Cestrian Electrical Co., Ltd.—Registered 25th June. Capital, £5,000. To acquire the business of power, heat, light, sound and vision engineer and contractor now carried on by T. R. Shaw at Northgate, Chester, as "The Cestrian Electrical Co." Permanent directors: T. R. Shaw, Lena M. Shaw and A. R. Mycock. Regd. office: 138, Northgate Street, Chester.

P. W. Baker & Sons, Ltd.—Registered 25th June. Capital £3,000. Manufacturers and dealers in electric lamps, fittings, apparatus, accessories, etc. Directors: P. W. Baker and J. E. Sherlock, managing director of British Thermostat Co., Ltd. Regd. office: 146a, Queen Victoria Street, E.C.4.

Ramage Winding Co., Ltd.—Registered 25th June. Capital, £100. Armature and coil winders. Directors: J. T. F. Ramage and Edith E. Ramage. Regd. office: 7, Attewood Avenue. N.W.10.

Tufcan Electrical Industries, Ltd.—Registered 9th June. Capital, £1,000. Electrical, mechanical and radio engineers. Directors: J. J. Cannan and R. Tuffnell. Regd. office: Thornfield, Delamer Road, Altrincham, Cheshire.

Vange Electrical Co., Ltd.—Registered 24th June. Capital, £1,000. Electrical contractors, engineers, manufacturers, repairers and dealers in dynamos, armatures, etc. Directors: J. Burnett, A. C. Attwell and A. C. Morse. Regd. office: Roden Chambers, 3, Roden Street, Ilford.

D. S. Baddeley Engineering Co., Ltd.—Registered in Edinburgh 19th June. Capital, £1,000. Electrical and mechanical engineers, etc. Directors: D. S. Baddeley, A. G. Turnbull, M. J. Kane and N. W. Maynard. Secretary: M. R. Watson. Regd. office: 62, Robertson Street, Glasgow.

Jowett & Throp (Contractors), Ltd.—Registered 29th June. Capital, £1,000. To acquire the business of an electrician, radio dealer and electrical contractor carried on by R. W. Throp at 76, Lowtown, Pudsey. Directors: C. Jowett and R. W. Throp. Regd. office: 76, Lowtown, Pudsey, Yorks.

Crossley & Fishwick, Ltd.—Registered 29th June. Capital, £1,500. Electrical engineers, manufacturers and dealers in electrical, radio and television apparatus, etc. Directors: J. Crossley (permanent), Elizabeth Crossley, F. E. Fishwick (permanent) and R. Yates. Regd. office: 183, Ribbleton Lane, Preston.

Neco (Warrington), Ltd.—Registered 26th June. Capital, £100. Electrical engineers, manufacturers, and dealers in electrical appliances and apparatus, etc. W. Scott, 13, Edwardes Square, W.8, is the first director.

Rota-Time Co., Ltd.—Registered 28th June. Capital, £1,000. Manufacturers, repairers and dealers in electrical and electronic apparatus, switchgear, etc. G. M. Baigent is the first director. Secretary: R. F. Lambert. Regd. office: Swinton House, 324, Gray's Inn Road, W.C.1.

Atkinson Battery Services, Ltd.—Registered 29th June. Capital, £3,000. To acquire the business of an electrical engineer and contractor and manufacturer of electrical equipment carried on by H. H. Atkinson. Directors: H. H. Atkinson and Mrs. Ada E. Atkinson. Solicitors: Gouldens, 16, Byward Street, E.C.3.

Miller & Stables, Ltd.—In the notice in our 2nd July issue the registration of the company was incorrectly given as in Belfast instead of Edinburgh. The directors are A. K. Stables (director of Maxwell Hotels, Ltd.), J. Rossie, J. MacKay and W. McCran.

Increases of Capital

Calcutta Electric Supply Corporation, Ltd.—Increased by £5,000,000, in 5,000,000 undetermined shares of £1 each, beyond the registered capital of £5,000,000.

Crompton Parkinson, Ltd.—Capital increased by £850,000, in 3,400,000 " A " ordinary shares of 5s. (to be converted into stock when fully paid), beyond the registered capital of £2,000,000.

Page & Miles, Ltd.—Increased by £6,000, in £1 7½ per cent second preference shares, beyond the registered capital of £6,500.

Receiver Appointed

Celestion, Ltd.—S. H. Gillett, 24, Basinghall Street, E.C.2, was appointed receiver on 3rd June, under powers contained in debentures dated 8th September, 1947 and 4th May, 1948.

Liquidations

Guy R. Fountain, Ltd. (" Tannoy ").—The first meetings of creditors and shareholders under the compulsory liquidation of this company were held on 7th July, when the Official Receiver reported that the winding-up order was made on 31st May on the petition of a creditor. The failure of the company was attributed to its inability to obtain further necessary capital. A statement of affairs showing the position of the company on the basis of a going concern, put the net assets at £119,044, a surplus, so far as the creditors were concerned, of £18,476, but a deficiency as regarded the shareholders of £1,236. A resolution was passed for the appointment of Mr. E. Langdon Davis, 58, Theobalds Road, London, W.C.1, as liquidator, with a committee of inspection.

Bex Electric, Ltd.—The first meetings of the creditors and shareholders under this compulsory liquidation were held on 7th July. It was reported, *inter alia*, that after the war the company was used mainly as a sales organization for Guy R. Fountain, Ltd., and in 1947 it was decided that the fixed assets should be taken over by Guy R. Fountain, Ltd. The present position was attributed by Guy R. Fountain, one of the directors, to the inability of Guy R. Fountain, Ltd., to obtain adequate finance. According to the statement of affairs filed there were ranking liabilities amounting to £27,750 of which £26,512 was due to unsecured creditors. The net assets totalled £31,096, leaving a surplus so far as the creditors were concerned of £3,346. Mr. R. L. Davis, of Saker & Davis, C.A., 58, Theobalds Road, London, W.C., was appointed liquidator, with a committee of inspection.

Wells Pridgeon Electrics, Ltd.—Winding up voluntarily. Liquidator, Mr. A. E. Attwood, 90, Queen Street, Cheapside, London, E.C.4.

Marconi-E.M.I. Television Co., Ltd.—Winding up voluntarily. Liquidator, Mr. T. Howorth, 3, Frederick's Place, Old Jewry, London, E.C.2.

Erlco (Electrical Services), Ltd., Electrical Services (St. Albans), Ltd., John Roberts (Manchester), Ltd., Battery Services (Eastbourne), Ltd., R. Kilpatrick & Co., Ltd., and Magbat, Ltd.—Winding up voluntarily. Liquidator, Mr. H. C. Gill, 10, Norfolk Street, Manchester, 2.

Bankruptcies

J. E. Larkin, electrical maintenance engineer, 86, Uxendon Hill, Wembley Park.—Receiving order made, 30th June, on a creditor's petition.

A. F. Howsley, electrical engineer, 25, Emesgate Lane, Silverdale, Lancs.—Trustee, Mr. T. Eaves, 47, Mosley Street, Manchester, appointed 2nd July.

R. H. Ball, electrical engineer, formerly at Gordon Street, Leamington Spa, now 36, Whitefriars Road, Hastings.—First meeting 20th July, at the Official Receiver's office, 37, Temple Street, Birmingham. Public examination, 10th September, at the Shire Hall, Warwick.

E. Marrow, electrical and radio engineer, trading as " Marrows Radio Service " at 123, King Street, Knutsford.—First and final dividend of 14s. 6½d. in the £ payable 30th July at the Official Receiver's office, 20, Byrom Street, Manchester.

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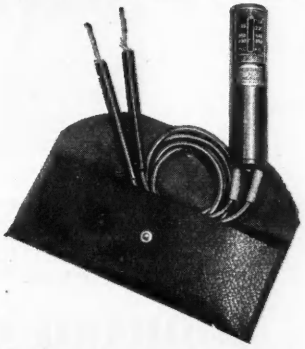

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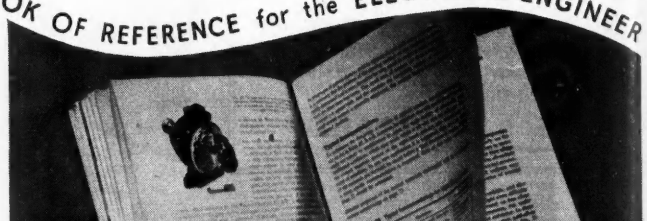

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STOCKS AND SHARES

STOCK Exchange markets continue to be overshadowed by the news from Berlin and the Middle East. Prices hold their ground, all things considered, with a tolerable degree of firmness, and, if there were to be any indication of rapprochement between Russia and the Western Powers, prices would probably enjoy a sharp upward twist. In the interval of waiting, investment prefers to hold aloof, and business in the House has been reduced to the nature of a trickle, as is shown by the published number of daily bargains recorded. It is only natural in the circumstances that prices should show a dull tendency with falls in the majority of cases where a change has occurred. Moreover, politics or not, this time of year is usually a quiet season in the Stock Exchange, and, taking everything into account, the inactivity of markets can hardly be deemed a matter for surprise. Electricity 3 per cents are a shade over 100; Transport Threes remain round about 96 $\frac{3}{16}$.

Deflating

Sir Stafford Cripps' reaffirmation, earlier this month, of what he calls the "disinflationary" policy has by no means stilled discussion of a subject with an active bearing on investments. Before he spoke, there was news of the cut in purchase tax on radio sets, for instance, followed by permission for bigger expenditure on houses. These raised a lively debating point as to whether the policy of discouraging the less essential forms of expenditure was to be halted before it realised either (1) the temporarily uncomfortable symptoms of local unemployment and hardship, or (2), the longer-term benefits of labour and materials diverted to the key industries. The Chancellor's last word, indicating that the process is to go forward, was taken to favour investments connected with capital construction, at the expense of those more concerned with the consumer's end.

Investor's Choice

Among electrical eqipment shares, yields now range from 4 per cent or even less on the favourites, to double figures (or, regrettably, nothing at all) in some of the lighter engineering sections. Owing to the thin state of Stock Exchange markets, anomalies are apt to occur within the various groups and are allowed to persist because of a general lack of enterprise and, also, of the expenses of switching from one share to another. Altogether, market conditions provide the prospective buyer with ample scope for discrimination.

Week's Price Changes

Two dozen falls in the *Electrical Review* list of prices include nearly every section, from Babcock & Wilcox, down 3s. to 62s. 9d., and Oriental Telephones similarly lower at 47s., to falls of half-a-crown in Hopkinsons, £5, Tube Investments, 5 $\frac{15}{16}$, Ericssons, 43s. 3d., and Westinghouse Brake, 62s. 6d. C. A. Parsons at 61s. 6d. have lost 2s. 3d., Walsall Conduits, a florin at 54s. 3d., while the remainder are mostly about $\frac{1}{16}$ easier. British Electric Traction deferred after changing hands at 1,610, recovered to 1,655, a loss of 20 points on the week. Cable ordinary and preference at 185$\frac{1}{2}$ and 124$\frac{1}{2}$ are both lower. The Indian group of electricity undertakings has moved in company with the rest. Electric & Musical Industries at 16s. 9d. are 1s. up, and English Electrics rallied to 45s. 9d. Victoria Falls at 7$\frac{3}{8}$ are 3s. 9d. lower. Tokyo Sixes fell 2 to 40$\frac{1}{4}$. Excellent figures from the Electric Construction Co. left the price unchanged at 47s. 6d., Aberdare Cables eased off to 61s. 3d.

Electrical Equipment Shares

Yields vary to some extent inside the electrical equipment groups. Henley's at their lowered price of 23s. 6d., yield 4$\frac{1}{4}$ per cent, and B.I.C., at 33s. 6d., return little more than 4 per cent. On Johnson & Phillips, Siemens and Enfields the return is around 4$\frac{1}{2}$ per cent, and on Aberdare Cables a fraction more. In the telephone group, the yields rise from below 4 per cent on Automatic Telephone & Electric, through Ericssons and Telephone Manufacturing, around the 4$\frac{1}{2}$ per cent mark, to £6 18s. per cent on H.T.A. at 14s. 6d. In the heavy branches, returns do not vary much between 4 and 4$\frac{1}{2}$ per cent, which covers, amongst others, A.E.I., G.E.C., Crompton, C. A. Parsons, English Electric and Reyrolle. On or above the 5 per cent level are Ever Ready, Switchgear & Cowans, Arons & Thorn Electric.

Cost of Investment

Apart from domestic and international complications, there is another factor which renders people a little cautious about investing just now. Costs and expenses are being more closely scrutinized in view of the fact that there is not so much money about as there was, say a year ago. To take one example, typical of thousands of others, the purchase of 100 General Electrics at 82s. 6d., the cost of which is £412 10s., means paying, in addition, £9 for the Government transfer stamp duty; 2s. 6d. the company's fee, a broker's commission of 9d. per share, £3 15s., and 2s. for contract stamp, making a total expense of £12 19s. 6d.

The dividend on 100 General Electrics is £17 10s., less income-tax of 9s. in the £, leaving £9 12s. 6d. net. The expenses, it will be noticed, cost a year-and-a-quarter's income before the purchaser recoups his outlay. In active markets, and in times when prices are on the rise, the question of costs may not make any particular difference to the waves of optimism. But when things are as quiet as they are to-day, and the all-over tendency is towards lower levels, the prospective purchaser looks with somewhat jaundiced eye at what he has to pay by way of expenses on his investment.

ELECTRICITY SUPPLY

Street Lighting Schemes.

Bath.—STREET-LIGHTING AGREEMENT.—The city engineer has reported to the Street-Lighting Sub-Committee that it has been agreed that the arrangement for the maintenance of lighting by the South Western Electricity Board shall continue for the time being. The engineer is to submit a further report in six months' time.

Beaumaris.—LIGHTING ON HOUSING ESTATES.—The Town Council proposes to have electric street lighting on new housing estates.

Bentley (Yorks).—SODIUM LIGHTING.—Eighty-eight sodium street lamps are to be installed from the Don Bridge to the end of Victoria Road.

Gateshead. — LIGHTING LOAN. — The Town Council has received sanction to a loan of £15,000 for the first section of an electric street lighting scheme. The use of fluorescent lighting is being considered in conjunction with the Ministry of Transport.

Sherburn (Co. Durham).—STREET LIGHTING REFUSED.—An application by the Parish Council for sanction to spend £1,000 on street lighting has been rejected.

Stockport. — PROPOSED CONVERSION. — The Electricity Committee proposes to convert the lighting of Edgeley Road from gas to electricity.

Stoke Newington.—EXTENSION SCHEME.—The Borough Council has received permission to borrow £3,200 for equipment for lighting Brownswood Road, Lordship Park and Manor Road by electricity.

Todmorden. — GAS-ELECTRIC CONVERSION. — The Town Council is to purchase equipment costing £960 for the conversion of sixty gas lamps to electricity.

Overseas

Canada.—DEVELOPMENTS IN ONTARIO.—The Ontario Hydro-Electric Power Commission has announced that the province has floated a $40,000,000 bond issue to finance the expansion of rural hydro-electric service, the erection of a new thermal generating plant at Windsor, and development of power sources at Des Joachims and Chenaux, on the Ottawa River, Pine Portage, on the Nipigon River, Earl Falls, south-east of Red Lake and Aguasabon, 170 miles east of Port Arthur.

Ceylon.—KELANI RIVER SCHEME.—Seven sites on the upper reaches of the Kelani Ganga are being investigated by the Irrigation Department as suitable for the location of storage reservoirs for the Kelani Ganga flood protection scheme. All these reservoirs are also intended to serve as sources of hydro-electric power. These sites are Glencorse Gap, Matiyagoda, Imbalama, Yogama, Moosakelle, Rondura and Darbar across the Magal Ganga.

Egypt.—ASWAN DAM PROJECT DELAYED.—*Reuter* reports from Cairo that a shortage of Swiss francs has resulted in the suspension of electrical work in connection with the Aswan dam project. An Egyptian Government representative is at present discussing with the Swiss Government the question of Egypt's acquiring Swiss currency, holdings of which "are far from sufficient for the country's needs," according to a Government spokesman.

Glasgow Transport Plan.

TRANSPORT

Glasgow.—TRANSPORT PLAN.—A passenger transport system to operate in Glasgow under the fifty-year plan prepared by Mr. R. Bruce, Master of Works, for the city's development is outlined in a report presented to the Corporation Transport Committee by Mr. E. R. L. Fitzpayne, general manager of the Transport Department. Proposals include the electrification of several of the surburban railway lines, the construction of new routes of reserved tracks for rail vehicles, and the provision of ring and radial bus services linking up with the electric vehicle system.

Liverpool.—INCREASED FARES PROPOSED.—In a report on a proposal to increase tram fares, the general manager of the Passenger Transport Department shows how the costs of labour and materials have advanced between March, 1946, and March, 1948. Trolley wire has gone up 83·02 per cent, steel 18·42 per cent, cable 3·029 20·22 per cent, cable 7·029, 19·11 per cent, cable 7·064 37·89 per cent, cable 19·052 43·26 per cent, electrical gear 55 per cent and electrical energy 11·7 per cent. There has been no change in electric lamp prices. The Department's wages bill during the two years advanced by £252,580 per annum.

Newcastle - on - Tyne. — CHANGE - OVER PROGRESS. — The change-over from trams to trolley-buses on the Benton route is expected to be completed by the autumn.

West Hartlepool.—TROLLEY-BUS PROFIT.—During the year ended 31st March last, the Town Council's trolley-bus undertaking made a profit of £1,491. Receipts were £54,747, compared with £53,006 the previous year.

PROPOSED POSTPONEMENT OF BUS SCHEME.—The Ministry of Transport has asked the Town Council to postpone its plan to order twenty-four motor buses to replace trolley-buses, on the grounds that the change is not essential. The Ministry points out that the trolley-buses to be replaced had a maximum age of only ten years. The Council is asking the Ministry to reconsider its attitude.

PARLIAMENTARY NEWS

By Our Special Reporter

DURING the Committee stage of the Gas Bill in the House of Lords, Lord Teynham moved an amendment to provide that one of the functions of the Area Boards should be "to satisfy at the lowest economical cost . . . all reasonable demands for gas within their area." He said that the public was becoming alarmed at the serious rise of prices which had occurred in the various nationalized industries. It had occurred in coal and it was occurring also in electricity. The acceptance of the amendment would go a long way to reassure the gas-consuming public on the important matter of price. There were over 4,000 trades and industries dependent on a supply of gas. If the price of gas were to be increased it would undoubtedly adversely affect our prices for many articles in the export trade. The high price of coal and electricity was already having that effect. When the trilogy of fuel and power was complete they might yet see a further restriction in our export trade owing to increases in the prices of fuel. The Lord Chancellor sympathized with the amendment and undertook to insert on the Report stage appropriate words to meet the case. On this understanding the amendment was withdrawn.

Lord Bridgeman moved an amendment to prevent the Area Boards manufacturing plant and fittings or selling, or hiring, or supplying gas plant. He said he did not see why it should not be perfectly possible for the Gas Council to do these things, as was provided in the Electricity Act. The Lord Chancellor agreed that he conceded the "not for export" principle under the Electricity Act and he was prepared to do so again under this Bill. He would move the necessary words on the Report stage. The amendment was withdrawn.

Lord Wolverton moved an amendment to provide that the Consultative Councils to be set up under the Bill should be set up within a time limit of three months from the vesting date. He explained that it was now eight or nine months since the Electricity Act was passed and three or four months since that industry was vested, and still the Consultative Councils for that industry had not been set up.

Lord Hall, replying for the Government, said that there had been delay in setting up the Councils but the Minister was blameless in the matter. The persons appointed or nominated to these Councils came from a varying number of organizations and a large number of local authorities, and there had been delay in the submitting of nominees to the Minister for his appointment. There had been a very large number of names—he thought about 1,400—which took quite a little sorting out. Lord Wolverton was tying the Minister rather too closely to the vesting date when they suggested three months, but he would try to insert suitable words on the Report stage. The amendment was withdrawn.

Lord Rennell moved a new clause providing that the consumer should have a free choice of the form of fuel he wished to have. Lord Lucas, for the Government, said that there was nothing in the Bill to restrict the consumer's choice. It might be necessary in a rural area where electricity was available to shut down an uneconomic gasworks. He declined to accept the clause but on a division it was carried against the Government.

Rural Supplies

Mr. Robens, Parliamentary Secretary to the Ministry of Fuel and Power, told Brigadier Rayner that the connection of supplies to farms and farm workers' cottages likely to assist increased food production was given very high priority in the Electricity Commissioners' Circular of 18th February, 1948, which laid down priorities for new non-industrial development. The detailed application of these principles was, of course, a matter for the Area Electricity Board concerned.

Television

Mr. Hobson, Assistant Postmaster-General, replying to Mr. John Lewis, said that the British Broadcasting Corporation hoped that its television station now being built at Sutton Coldfield, near Birmingham, would be working in the autumn of next year. One of the next stations would be in the north of England.

Hearing Aids

In the House of Lords the Earl of Listowel said that 1,450 of the magnetic (external receiver) type of the "Medresco" hearing aids would be available for issue on 5th July, and more would be coming forward as needed. Unexpected production difficulties with the crystal (insert receiver) type had arisen and its issue would be delayed for some weeks.

Kidnapped Jerusalem Electric Officials

Mr. Pickthorn asked for information about the kidnapping of five officials of the Jerusalem Electric & Public Service Corporation, Ltd.

Mr. McNeil, Minister of State, said that the British Consulate-General in Jerusalem was doing everything possible to secure their release and he had been reliably informed that the men were not being ill-treated. Later he gave the names of the men concerned. They are Messrs. T. M. E. Bryant (deputy general assistant), T. A. Downs (technical assistant), W. G. Hawkins (station superintendent), F. W. Sylvester (clerk) and A. T. I. Leach (general duties officer).

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2

1942

GENERAL Electric Co., Ltd., and H. T. Ramsay.—"Gas-filled electric rectifiers." 3373. 13th March, 1942. (603778.)

1944

F. Rimmington.—"Remote control of electric generators or othercurrent supply means for arc welding." 11173. 12th June, 1944. (Cognate applications 13563/44. 18204/44, 1881/45 and 8512/45.) (603705.)

Asea Electric, Ltd., G. Single and S. Baynes.—"Method of effecting speed change in change pole a.c. motors." 19366. 9th October, 1944. (603712.)

English Electric Co., Ltd., and G. Chadwick.—"Fastening metal parts together by a process involving electric heating." 23815. 29th November, 1944. (603784.)

1945

N. C. Barford.—"Circuit arrangements embodying velocity modulation electron-discharge devices." 7317. 22nd March, 1945. (603715.)

Automatic Telephone & Electric Co., Ltd., and G. T. Baker.—"Telephone systems." 14949. 13th June, 1945 (603789.)

Micafil, Ltd.—"Insulation of transformer end coils." 21082. 31st August, 1944. (603721.)

W. W. Constantine (General Motors Corporation).—"Electrical storage batteries." 21428. 22nd August, 1945. (Convention date not granted.) (603722.)

Metropolitan-Vickers Electrical Co., Ltd., and F. R. Mason.—"Electrically-driven web-winding equipment." 22373. 30th August, 1945. (603723.)

British Thomson-Houston Co., Ltd., W. D. Sinclair, and R. Latham.—"Magnetrons." 25581. 2nd October, 1945. (603734.)

General Electric Co., Ltd., and L. G. Ward.—"Control of electric ventilating fans." 28591. 29th October, 1945. (603737.)

Standard Telephones & Cables, Ltd., and E. C. Lee.—"Electric cables." 28593. 29th October, 1945. (603738.)

W. H. Dean & Son, Ltd., and W. Dean.—"Casings of domestic wash boilers and washing-machines." 28594. 29th October, 1945. (603739.)

J. N. Emery.—"Dynamo-electric machines." 28600. 29th October, 1945. (603741.)

English Electric Co., Ltd., and R. D. Ball.—"Dynamo-electric machines." 28703. 30th October, 1945. (603754.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—"High temperature elastic fluid turbines." 28728. 30th October, 1945. (603798.)

General Motors Corporation.—"Load control and indicator system for engine-electric locomotives." 28970. 6th November, 1944. (603851.)

E. K. Cole, Ltd., and F. J. Moore.—"Thermal starting switches suitable for electric-discharge lamps." 29075. 2nd November, 1945. (603867.)

J. Lucas, Ltd., and H. H. Foxall.—"Electric short-time switches." 29103. 2nd November, 1945. (603870.)

Standard Telephones & Cables, Ltd.—"Methods of manufacture of selenium elements." 29147. 18th December, 1944. (603877.)

Benjamin Electric, Ltd., and J. J. Fenn.—"Detachable tops for lighting fittings." 29148. 2nd November, 1945. (603878.)

H. B. Prentice.—"Electrical pin plug sockets." 29177. 2nd November, 1945. (603882.)

J. B. Tannahill—"Electromagnetic switch." 29229. 3rd November, 1945. (603892.)

Sperry Gyroscope Co., Inc.—"Sockets for electrical devices." 29231. 4th November, 1944. (603893.)

W. McGeoch & Co., Ltd., and H. S. Watt.—"Water-tight electric light fittings." 29280. 5th November, 1945. (603900.)

Ferranti, Ltd., M. K. Taylor, and F. C. Williams.—"Thermionic valve systems." 29284. 5th November, 1945. (603901.)

Hoover, Ltd., and F. J. H. Leib.—"Manufacture of electric commutators." 29306. 5th November, 1945. (603905.)

Maschinenfabrik Oerlikon.—"Combustion chambers for gas turbine plants." 29387. 30th November, 1944. (603918.)

Whiteley Electrical Radio Co., Ltd., T. Clatworthy, and W. H. Spencer.—"Push-button electrical switch assemblages." 29434. 6th November, 1945. (603924.)

H. F. P. Caton and G. N. Pritty.—"Electric fires." 29447/8. 6th November, 1945. (603925/6.)

National Carbon Co., Inc.—"Primary galvanic cells." 29451. 14th December, 1944. (603927.)

British Thomson-Houston Co., Ltd.—"Speed governors." 29456. 9th November, 1944. (603928.)

British Insulated Callender's Cables, Ltd., and D. T. Hollingsworth.—"Means for detecting leaks in electric cables or pipe lines containing fluid under pressure." 29523. 6th November, 1945. (603935.)

Philips Lamps, Ltd.—"Electric discharge tubes." 29543. 15th July, 1940. (603938.) "Electric discharge tubes having a directional electron beam." 29544. 3rd July, 1940. (603939.) "Blocking-layer cells." 29545. 3rd July, 1940. (603940.) "Circuit arrangements for expanding the volume range of electric oscillations." 29546. 3rd July, 1940.) (603941.)

General Electric Co., Ltd., E. Friedlander, A. W. Ford, E. L. Hoyle and J. R. Reed.—"High-voltage electric machines and apparatus." 29669. 7th November, 1945. (603957.)

W. T. P. Kirkham.—"Sub-aqueous electric switches." 29670. 7th November, 1945. (603958.)

T. J. Hall.—"Electric couplings." 29678. 7th November, 1945. (603959.)

Automatic Telephone & Electric Co., Ltd., and G. T. Baker.—"Telephone systems." 29767. 8th November, 1945. (603828.)

Naamlooze Vennootschap Fabriek van Electrische Apparaten Voorheen F. Hazemeijer & Co.—"Alternating current electromagnets or relays." 30735. 28th August, 1942. (603759.)

British Thomson-Houston Co., Ltd.—"Electro-magnetically operated switches." 31024. 21st November, 1944. (603965.)

S. E. J. M. Jensen.—"Water turbine, driven by tide-water or fast flowing river, for the purpose of generating electricity." 31028. 19th November, 1945. (603966.)

I. J. Dunningham, and C. Vinten.—"Electric plug couplings." 31075. 19th November, 1945. (603975.)

Maschinenfabrik Oerlikon.—"Contact device for instrument type relays." 31098. 18th December, 1944. (603981.)

British Insulated Callender's Cables, Ltd., H. Hill, and S. Beckinsale.—"Presses for the extrusion of lead and lead alloys." 31132. 20th November, 1945. (603986.)

Metropolitan-Vickers Electrical Co., Ltd., and K. Baumann.—"Multi-stage turbines and compressors." 31194. 20th November, 1945. (Cognate application 34276/45.) (603996.)

A. C. Cossor, Ltd., and A. N. A. Melchior.—"Electrical terminals." 31259. 20th November, 1945. (604014.)

Singer Manufacturing Co.—"Electrostatic bonding machine." 31273. 7th February ,1945. (604018.)

Conduit Fittings, Ltd., and J. Smith.—"Adaptors for electrical installation junction boxes." 31280. 21st November, 1945. (604020.)

Escher Wyss Maschinenfabriken Akt.-Ges.—"Thermal power plants." 31354. 12th and 14th December, 1944 respectively. (604028/9.)

Teletype Corporation.—"Photoelectric telegraph transmitters." 31357. 15th June, 1944. (604030.)

J. Lucas, Ltd., H. Silman, A. Freeman and H. S. Joachim.—"Electric current rectifiers." 31392/5. 21st November, 1945. (604037/40.)

V. Hope.—"Protecting devices for electric circuits and apparatus." 31432. 22nd November, 1945. (604045.)

K. T. Grubb.—"Electrolytic polishing of metallic surfaces." 31508. 27th November, 1944. (604056.)

British Thomson-Houston Co., Ltd., W. J. Gibbs, and J. H. Walker.—"Electric frequency conversion systems and apparatus." 31518. 22nd November, 1945. (604059.)

E. K. Cole, Ltd., and F. J. Moore.—"Thermal delay switches suitable for starting electric discharge lamps and for protective circuits for other electric discharge devices." 31565. 23rd November, 1945. (604067.)

E. Wild and C. S. Wright.—"Waveguides for conveying electromagnetic energy at ultra-high frequencies." 31630. 23rd November, 1945. (604076.)

Hartford-Empire Co.—"Photo-electrically controlled inspection apparatus." 31645. 24th August, 1945. (603763.)

British Thomson-Houston Co., Ltd.—"Vibration translating devices." 31655. 28th November, 1944. (604077.)

Sperry Gyroscope Co., Inc.—"Speed controlling systems for electric motors." 31676. 23rd November, 1944. (604080.)

S. Marks.—"Electric irons." 31678. 23rd November, 1945. (604081.)

G. Villebonnet.—"Method and installation for continuous voltage regulation of continuous electric current sources." 31707. 24th November 1942. (604094.)

R. E. Guillemant.—"Variable inductances for use in oscillating circuits. 31709. 5th February, 1943. (604095.)

General Motors Corporation.—"Fluid-pressure responsive electric switch." 31729. 10th February, 1945. (604098.)

International Electrolytic Plant Co., Ltd., C. E. Bowen.—"Electrolytic cells." 31740. 24th November, 1945. (604100.)

British Electrical & Allied Industries Research Association, and H. W. Baxter.—"Electric fuses." 31744. 24th November, 1945. (Cognate application 15243/46.) (604102.)

L. Peel, and T. H. Carr.—"Tool for and method of stripping rubber or other insulation from cables, wires or flex." 33428. 11th December, 1945. (603767.)

British Thomson-Houston Co., Ltd., and W. J. Scott.—"Electric condensers." 33936. 14th December, 1945. (603834.)

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G. Harrison, C. H. Neal, and S. R. Sheldon.—"Dish-washing machines." 9092. 25th March, 1946. (603771.)

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Argentina.—BUENOS AIRES.—28th October. Direccion General de Fabricaciones Militares, Avenida Cabildo No. 65, Buenos Aires. Cable making and wire drawing machinery. (Ref. E.P.D. 37304/48.)*

22nd July. Department of Water and Electrical Power. Two turbo-alternator sets for the Ing Julian Romero power station. (Ref. 38178/48).*

Australia.—QUEENSLAND.—27th August. Brisbane City Council. Fifty distribution transformers, outdoor type ranging from 200 to 1,000 kVA. (Ref. 37275/48)*

Belfast.—6th August. Electricity Department. Grit arresting plant. (See this issue.)

Canada.—TORONTO.—3rd August. Hydro-Electric Power Commission of Ontario. Two steam generating units, etc., for two 60,000-kW steam turbo-generators at Windsor generating station. (Ref. 30188/48).*

Dagenham.—24th July. Town Council. 750 yd of 250- and 660-V, armoured 3-core and 2-core cable, v.i.r. insulated, in various diameters. Particulars from borough engineer

Goole.—3rd August. Town Council. Electrical work for houses (30) and flats (12) on the Moorfield site. Particulars from borough engineer, Municipal Offices.

Iran.—TEHERAN.—4th August. Iranian Tobacco Monopoly. Various engineering tools, electrical sundries, etc. Conditions and specifications can be obtained from the Chancery of the Iranian Embassy, 50, Kensington Court, London, W.8.

Luxembourg.—Telegraph and Telephone Department. Supply of telegraph and telephone materials. Division Technique, 17, Rue de Hollerich, Luxembourg.

New Zealand.—WELLINGTON.—27th July. Post and Telegraph Department (Stores Division) G.P.O. 81½ miles cable, switchboard and No. 23 S.W.G. conductors. (Ref. 37769/48).*

Pembroke.—10th August. Town Council. Electric sewage pumping sets for Kingswood sewerage scheme. Particulars from the borough engineer, Municipal Offices, Pembroke Dock.

Siam.—BANGKOK.—6th September. Railway Department. One d.c. and one a.c. welding plants. (Ref. 37632/48).*

South Africa.—CAPE TOWN.—6th August. Electricity Department. Current transformers and time switches. (Ref. 36700/48.)*

DURBAN.—10th September. Electricity Department. Two 2,500-kVA three-phase on-load tap-changing transformers, 33,000/6,600 V. (Ref. 37478/48).*

Sutton and Cheam.—30th July. Corporation. Electrical installation in 21 flats, Clensham Lane housing site, Sutton. (9th July.)

Uruguay.—MONTEVIDEO.—Usinas Electricas y Telefonos del Estado.

30th July. 1,000 two-way switches on rocking keys, 400 auxiliary bells, 750 socket bases for telephones, and 500 plugs for these sockets. (Ref. E.P.D. 37233/48.)*

5th August. Two electric pumping sets. (Ref. E.P.D. 37499/48.)*

30th August. Armoured cable and complementary material. (Ref. 37498/48.)*

Wanstead and Woodford.—26th July. Town Council. Trunk road lighting. (9th July.)

* Specifications may be inspected at the Export Promotion Department, Thames House North, Millbank, S.W.1.

Orders Placed

Loughborough.—Corporation. Accepted. Wiring of ninety-six houses (£2,665).—Hobson & Scott.

Plymouth.—Education Committee. Recommended. Electrical installation at Honicknowle primary school (£1,257).—Devon Electric & General Services.

West Hartlepool.—Corporation. Accepted. Mercury vapour street lamps.—Revo Electric Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aldridge.—County primary school, Pheasey Estate, Great Barr; county architect, Stafford.

Ashton-under-Lyne.—Public hall and civic restaurant, Warrington Street and Spring Street; borough surveyor, Municipal Buildings.

Barnet.—Infants' school, Brookside South (£59,000); Middlesex county architect, Vauxhall Bridge Road, S.W.1.

Basingstoke.—Technical school; county architect, Winchester.

Bexhill-on-Sea.—Houses, Ninfield Road (40) and Grange Court Estate (20); borough engineer.

Birkenhead. — Factory, Neston; Morgan Crucible Co., Ltd., Battersea, London, S.W.

Blackburn.—Junior schools, Intack and Longshaw Estates; borough engineer.

Braddan.—Alterations, Infirmary (£21,000); Davidson, Marsh & Co., architects, 16, Athol Street, Douglas, I.O.M.

Brighton.—Bungalows (56), Hollingbury Estate; borough engineer. Bakery, Industrial Estate; L. G. Stott, architect, Denehurst, Bavant Road.

Bromley.—Houses, Hayes Place Estate (400), Coppice Estate (300), Heathfield, Keston (60), and Princes Plain (50); borough engineer.

Burley - in - Wharfedale. — Nurses' hostel, therapy pavilion, and modernization of laundry, Scalebor Park Hospital; county architect, Wakefield.

Burnley.—Works extensions, Caldervale Road; Burnley Paper Works Co., Ltd.

Bury. — Primary school, Brandlesholme Estate; borough engineer, 28, Bank Street.

Cambridge.—School, Girton (£55,000); county architect, Shire Hall.

Cheltenham.—Omnibus station, Royal Crescent, for T.C.; borough engineer.

Chigwell.—Extensions, Luxborough sewage works, and reconstruction of Millers Lane sewage works; Howard Humphreys & Sons, 17, Victoria Street, Westminster.

Clitheroe. — Houses (82), Henthorn site; borough engineer, Church Street.

Cockermouth.—Factory for West Cumberland Industrial Development Co., Ltd.; Sir Alexander Gibb & Partners, 1, Queen Anne's Gate, S.W.1.

Croydon.—Technical college and college of art; Robert Atkinson, architect, 13, Manchester Square, W.1.

Dagenham.—Works extensions, for the Ford Motor Co., Ltd.; T. A. McInery, chief engineer.

Darlington.—Kitchens and dining halls, Eastbourne Secondary School; borough architect.

Derby.—Houses (136), Wood Road, Chaddesden; borough architect, Council House.

Droitwich.—Junior school; county architect, 60, The Tything, Worcester.

Dukinfield.—Houses (42), Yew Tree Lane; town clerk.

Durham.—Junior mixed and infants' school, Aycliffe; G. Baines, architect, 12, Guildhall Street, Preston, Lancs.

Edinburgh.—Works extensions; James H. Lamont & Co., Ltd., Gylmuir Road.

Fulham.—Fluorescent lighting installation, North Branch Library (£350) for Borough Council.

Gateshead.—Extensions, Lobley Hill, for Co-operative Bakeries, Ltd.; P. L. Browne, Son & Harding, architects, Pearl Buildings, Northumberland Street, Newcastle.

Glasgow.—Nurses' home, Western Infirmary; R. Love, architect, 10, Kingsdyke Avenue.

Grimsby. — Primary schools, Yarborough Road, Central Parade; borough engineer.

Hackney.—Flats (176), Warwick Grove; Messrs. Joseph, architects, 10, Lowndes Square, S.W.1.

Halesowen.—Flats, Kent Road, Lapal, Hasbury Farm and Fatherless Barn Estates; A. T. Butler, architect, 31, Priory Road, Dudley.

Hounslow.—Factory, Whitton Deene; Trussed Concrete Steel Co., Ltd., 6, Collingham Gardens, S.W.5.

Jarrow-on-Tyne.—Houses (44); borough engineer.

Manchester.—Works extensions, Quay Street, for Globe & Simpson (Manchester), Ltd.; Young & Purves, architects, 12, St. Ann's Square.

Newcastle-on-Tyne.—Works extensions, Trafalgar Street; North Eastern Trade Setters, Ltd. Factory extensions, Pipe Track Lane; Thos. Ness, Ltd.

Newcastle (Staffs.).—Factory, Lower Milehouse Lane, for Metalcraft, Ltd.; Hollins, Jones & Oldacre, architects, Lloyds Bank Chambers.

Factory, Holditch; Tilsley & Lovatt, Ltd., 51, Kensington Road, Oakhill, Stoke-on-Trent.

Palmers Green.—Factory additions; James Burton & Sons, Ltd., Hedge Lane.

Wood Green.—Flats (40), Bounds Green; borough engineer.